STEEL
The Metalworking Weekly
FEBRUARY 13, 1961

U. S. Steel's Roger Blough and others cite ways to win . . .

PROGRAM FOR MANAGEMENT

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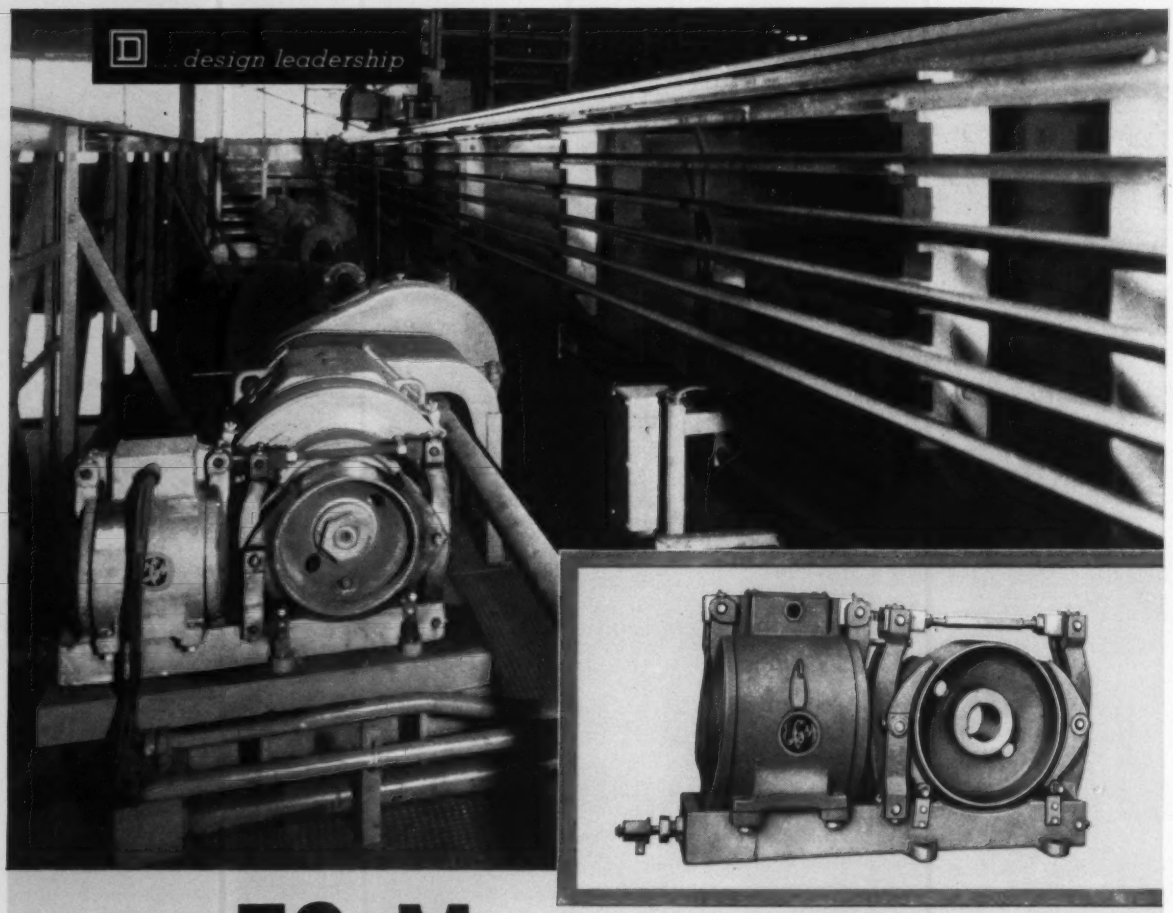

NEW EC&M ELECTRIC BRAKE for both PARKING and SERVICE

For the first time, here is an all-electric brake which combines an emergency or parking brake with a service brake. The new **AT** (**A**djustable **T**orque) brake was primarily designed for EOT crane bridge drives, but is equally well suited for travel motions on transfer cars, coke pushers and similar applications.

The new **AT** brake has important advantages. There are no hydraulic or air lines which can be affected by vibration or temperature extremes. Being electrically operated, the **AT** brake can be used with man-trolley and floor-operated cranes.

The new EC&M brake consists of two magnets and two armatures on a single frame. An easy-to-operate foot pedal applies 3 points of adjustable torque for controlled service braking. In addition, a separate spring-applied torque provides parking and emergency braking on power failure. Both service and emergency braking torques can be adjusted independently to fit the application.

The new **AT** brake is easy to install and maintain. Only three control leads (or collectors) are required for brake operation. **AT** brakes meet all AISE ratings and mounting dimensions.

For further information, contact your local Square D Field Engineer, or write Square D Company, EC&M Division, 4500 Lee Road, Cleveland 28, Ohio

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EC&M DIVISION • CLEVELAND 28, OHIO

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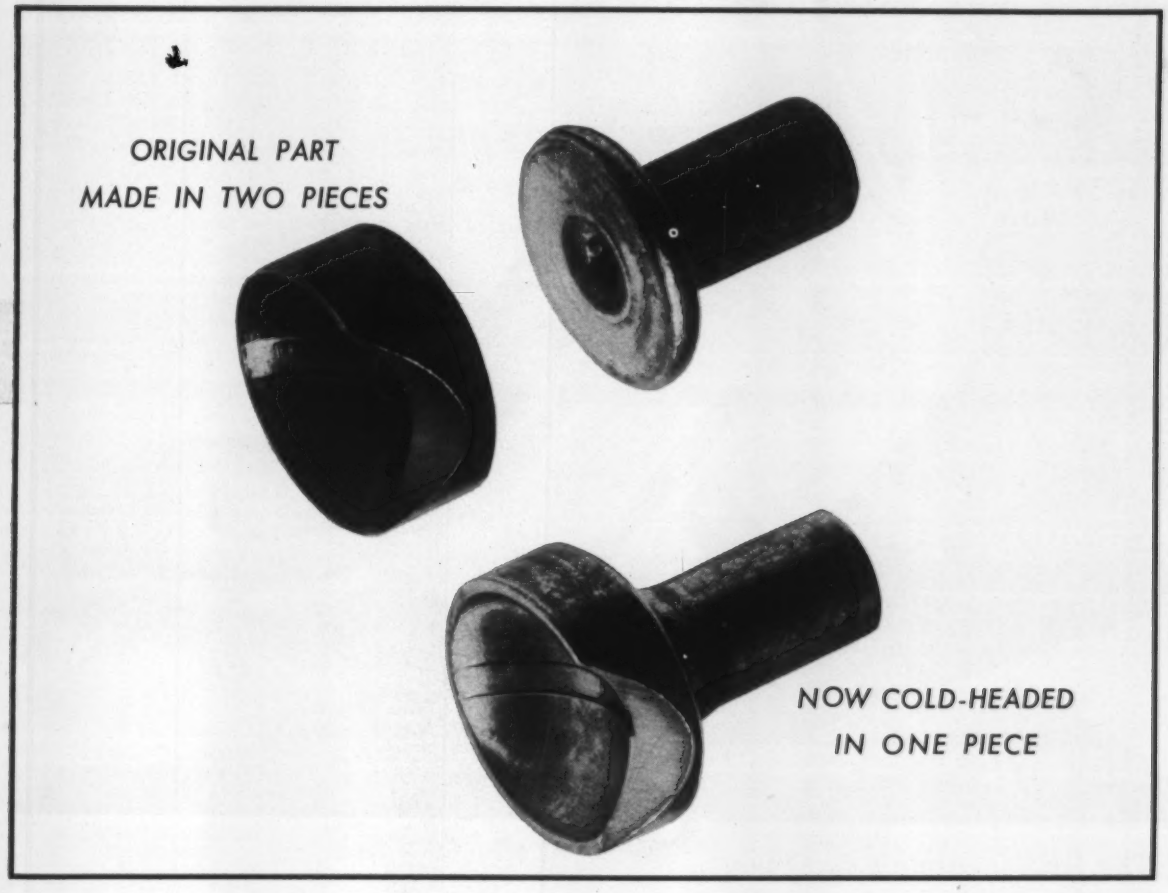

Cold-heading cuts costs—
replaces two parts with one!

The two-piece part, comprising a stud and a seat, has been replaced by a single part which is now cold-headed at considerable savings, It's used in the assembly of an automotive steering-rod relay system.

A special type of Bethlehem cold-heading wire was developed for this job. Costs are well under the previous method of manufacture. Cups have good surface finish and high strength.

This is a typical example of the small parts which are constantly under study by manufacturers searching for better materials, improved methods, and lower costs.

Look at these advantages of cold-heading

High-speed production . . . low scrap loss . . . economical stock . . . high strength . . . minimum of finishing operations.

Perhaps your product can be cold-headed

Heading-quality wire, custom-made for the job, has long been a Bethlehem specialty. Our metallurgical engineers will gladly work with you if you have a product that might be cold-headed. For any of your wire needs, call your nearby Bethlehem office, or write us at Bethlehem, Pa.

Steel

For strength
. . . economy
. . . versatility

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.
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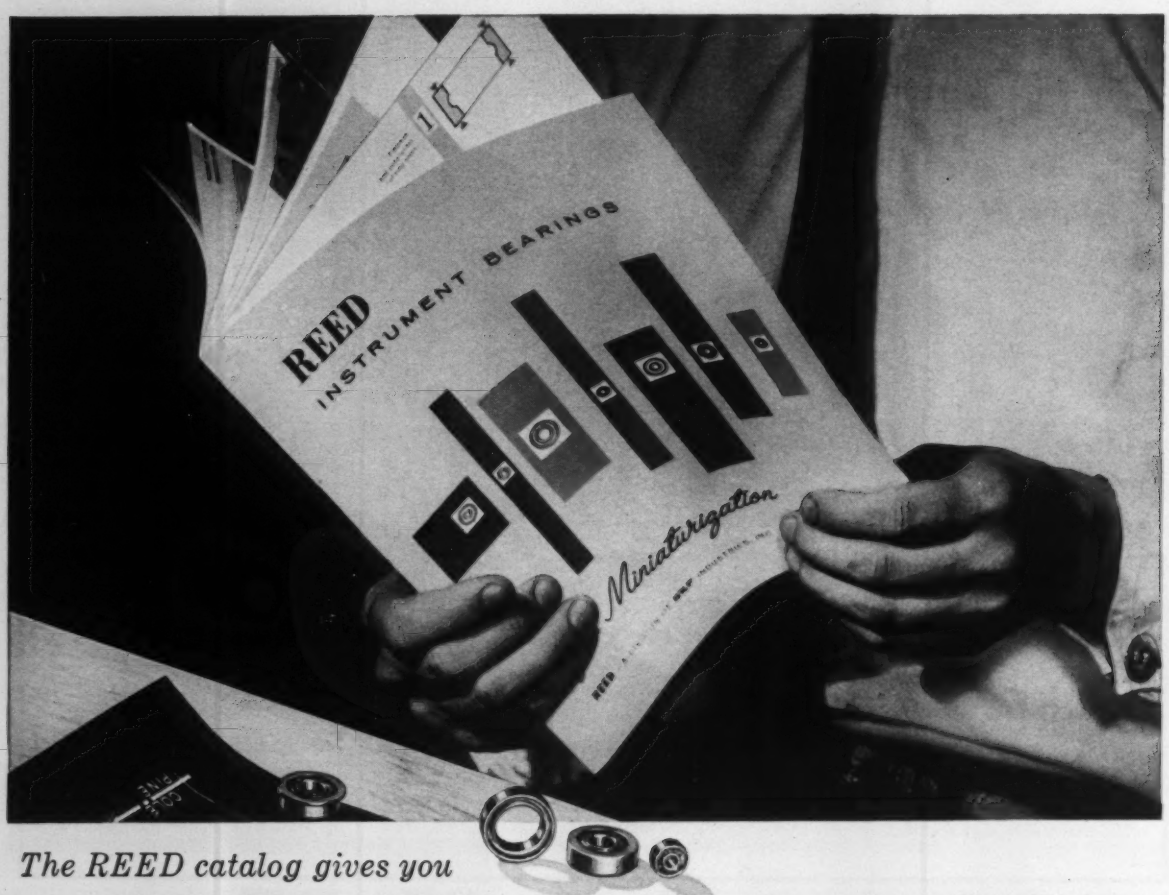

The REED catalog gives you

QUICK ANSWERS TO TOUGH QUESTIONS ABOUT INSTRUMENT BEARINGS

Should we specify ABEC-7 instead of ABEC-5? What's the recommended lubricant: oil or grease? What shaft and housing tolerances shall we use? Should extended inner ring bearings be specified for the application?

Questions like these can fly fast and furious when you're on a project. That's exactly when you need REED's catalog on instrument bearings. Because, this small but specific reference combines valuable information with vital statistics on instrument bearings. There's no nonsense—just facts. Data on load ratings, fits, tolerances, etc. are all easy to find.

REED specialists are also readily available to help you with any bearing problem, large or small. These men are specially trained and experienced—fully able to make tiny bearings do big, important jobs. And they're located near you, as shown in the box at right. 6017

For a copy of the REED Instrument Bearing Catalog—or help with an instrument bearing problem—call or write:

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Phone: UPton 0-5814 or
EXmont 8-3204

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Philadelphia 32, Pa.
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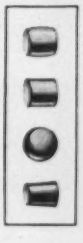

Division of
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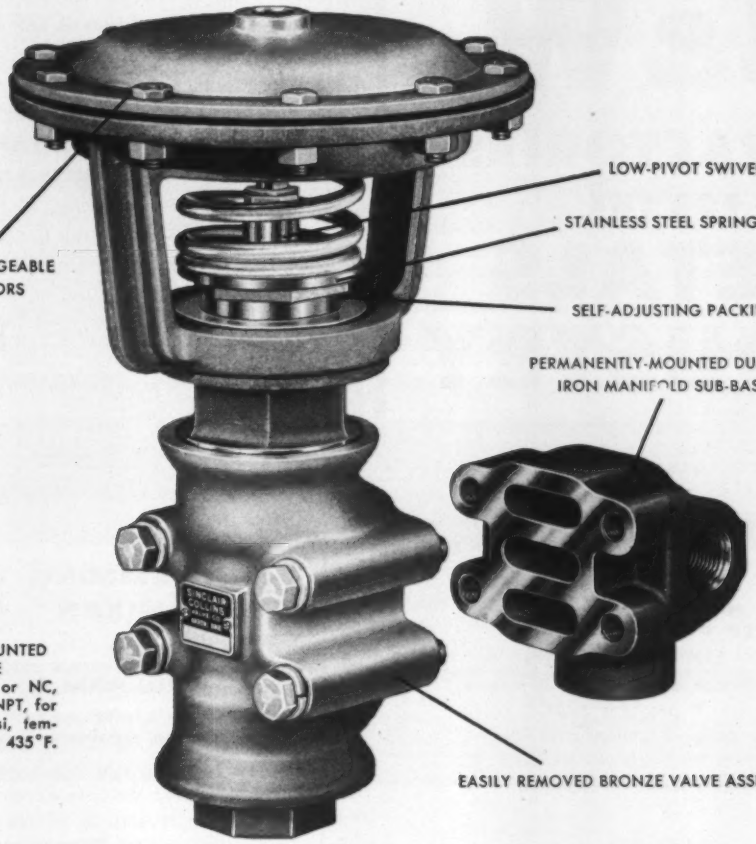
INDUSTRIES, INC.

NEW - SINCLAIR-COLLINS

1/2" manifold-mounted steam valve



S-C MANIFOLD-MOUNTED STEAM VALVE
2- and 3-way NO or NC, tapped ½- or ¾-in. NPT, for pressures to 350 psi, temperatures from 0 to 435°F.

Want excellent flow characteristics and bubble-tight sealing? Want maximum service life and minimum downtime for maintenance? Want compact, versatile design and ease of installation? Then you'll specify Sinclair-Collins' new manifold-mounted steam valve.

S-C's low-pivot hollow swivel stem places the pivot point *within* the extra-long bearing area to minimize side thrust and wear . . . provides maximum packer life. Self-adjusting spring-loaded Teflon chevron packing requires no attention. Piloting of all assembled components eliminates misalignment of stem. These features, plus Sinclair-Collins' precision manufacturing techniques are your assurance of long trouble-free valve life.

What's more, S-C's new valve can be converted from NO to NC, or vice versa, by rotating it 180° on the manifold sub-base.

Some day, maintenance will be necessary . . . it's simple . . . just loosen four mounting bolts, remove the valve for later bench servicing and install a replacement . . . downtime can be measured in minutes!

Find out how this advanced design valve can improve the performance of machines you have in service or on the drawing board. Your Sinclair-Collins field engineer has all the details.

For more information, write for free Bulletin MV-60. Address The Sinclair-Collins Valve Company, 454 Morgan Avenue, Akron 11, Ohio, Dept. ST-261.

The SINCLAIR-COLLINS VALVE Co.
DIVISION OF INTERNATIONAL BASIC ECONOMY CORPORATION (IBEC)
AKRON 11, OHIO

8128

New
B&W
REFRACTORIES FOR THE METALS INDUSTRY

B&W's line of refractories has been enlarged by the addition of new heavy duty firebrick and new ramming mixes. These new products, now offered after many years of developmental and field experience, are specifically designed for superior service in blast furnaces, electric furnace roofs, submarine ladles, metal mixers, soaking pits, billet and slab heating furnaces, salt bath furnaces, aluminum melting furnaces, lead melting furnaces, zinc recovery furnaces, nickel smelting and copper and brass furnaces.

FIREBRICK

★

KAO-HB

HIGH BURNED SUPER DUTY FIREBRICK

Fusion point 3220 F. This brick offers an excellent balance of properties to assure superior service. It provides approximately 5% more alumina content and lower total impurities than competitive brick. It has excellent spalling resistance.

KAO 60

60% ALUMINA FIREBRICK

Fusion point 3250 F. Provides higher hot load strength than any competitive brick. Spalling loss is only 1%.

KAO 70

70% ALUMINA FIREBRICK

Very low total impurities provide long life. Spall loss of only 2%.

RAMMING MIXES

★

MULRAM E

USE LIMIT 3200F
ALUMINA CONTENT–80%

This new ramming mix with extremely low permeability provides exceptional resistance to slag or molten metal penetration. High strength provides good erosion resistance.

MULRAM EF

USE LIMIT 3100F
ALUMINA CONTENT–80%

Similar to Mulram E but supplied in finer grain.

FOR COMPLETE PROPERTIES SHEETS and additional information on these new B&W Refractories products, write to The Babcock & Wilcox Company, Refractories Division, 161 East 42nd Street, New York 17, N. Y.

B&W

THE BABCOCK & WILCOX COMPANY

REFRACTORIES DIVISION

R-667

B&W Firebrick, Insulating Firebrick, and Refractory Castables, Plastics, Ramming Mixes, Mortars, and Ceramic Fiber.

At Work

The gentlemen pictured above are working on a STEEL story that appears to the East of here on Page 73. Roger Blough, left, chairman of U. S. Steel Corp., is answering questions put by New York Editor Ben Price. His answers show up in the third installment of our 1961 Program for Management. Associate Editor George Howick is in charge of this particular article, and Associate Managing Editor John Morgan is in charge of the series.

In fact, we could list at least 20 more persons who had a part in this article—to give you an idea of the number of people, both on and off the magazine's masthead, who have a hand in delivering accurate, interpretive, usable information to you.

Cropping Up

Geraldine, our cleaning woman and night editor, is an avid newspaper reader. Since STEEL editors subscribe to many, she has a broad range. The other morning we found the editorial page torn from the Jan. 15 issue of the *Cincinnati Enquirer*, marked with arrows and her distinctive exclamation marks. She was drawing our attention to a column by the *Enquirer's* executive editor, Brady Black. He was on a trip to London not long ago. His seat mate on the jet was H. Thomas Hallowell Jr. president of Standard Pressed Steel Co., Jenkintown, Pa. We'll let Mr. Black take over:

"Mr. Hallowell pulled from his business case a copy of a STEEL article showing employment costs in manufacturing in U. S. dollars . . ."

Standard Pressed Steel's prexy had a copy of our impact report of Sept. 5, 1960, on foreign competition.

Copies of that impact report and the second one, on People Power and the use of human resources (Jan. 2, 1961), are available at $2 a copy. Write STEEL, Reprint Dept., Penton Bldg., Cleveland 13, Ohio.

Crystal Ball Department

At a yearend luncheon given by the Automobile Manufacturers Association, automobile writers in Detroit guesstimate U. S. passenger car and truck production for the next year. Last June, in citing the ups and downs of STEEL's Don Postma, we observed that during his first year in Detroit, Don beat all the other scribes. A year later, he won in the truck category. In his third year, he got the booby prize. In 1959, no prize—which, we concluded, was a step up from the booby prize.

We proudly report that in 1960, Don took the grand prize, a $30 gift certificate, for best all-round forecasting.

When he won the first year, Don turned the gift certificate over to his wife. By the time she was through shopping, his generosity had cost him the prize and an extra $25. This time, he bought a hat.

New Job for Irwin Such

Irwin H. Such has relinquished his title of editor-in-chief of STEEL to become vice president-editorial for Penton Publishing Co. Penton publishes *Automation, Foundry, Machine Design,* and *New Equipment Digest,* as well as STEEL. He will function in an editorial liaison capacity between Penton publications and as a consultant to them.

Irwin came to Penton in 1928 after being graduated from Western Reserve University, Cleveland. He became engineering editor of STEEL in 1943, editor in 1946, and editor-in-chief in 1956.

STEEL, the metalworking weekly, is selectively distributed without charge to qualified management personnel with administrative, production, engineering, or purchasing functions in U. S. metalworking plants employing 20 or more. Those unable to qualify, or those wishing home delivered copies, may purchase copies at these rates: U. S. and possessions and Canada, $10 a year; all other countries, $30 a year; single copies, 50 cents. Metalworking Yearbook issue, $2. Published every Monday by The Penton Publishing Co., Penton Bldg., Cleveland 13, Ohio. Accepted as controlled circulation publication at Cleveland, Ohio.

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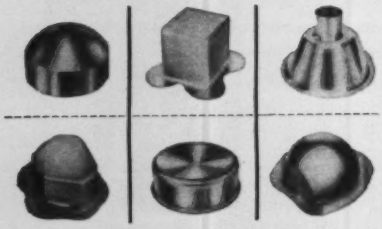
PRECISION-FORMED
METAL
COMPONENTS

Hydroforming, Deep Drawing and Spinning

You can depend on KAUPP for complete service from design to delivery on precision-made metal parts and sub-assemblies Ultra modern metal working facilities, plus wide experience on military and commercial requirements are available to solve your problems. Send drawings for quotations or phone for new illustrated bulletins!



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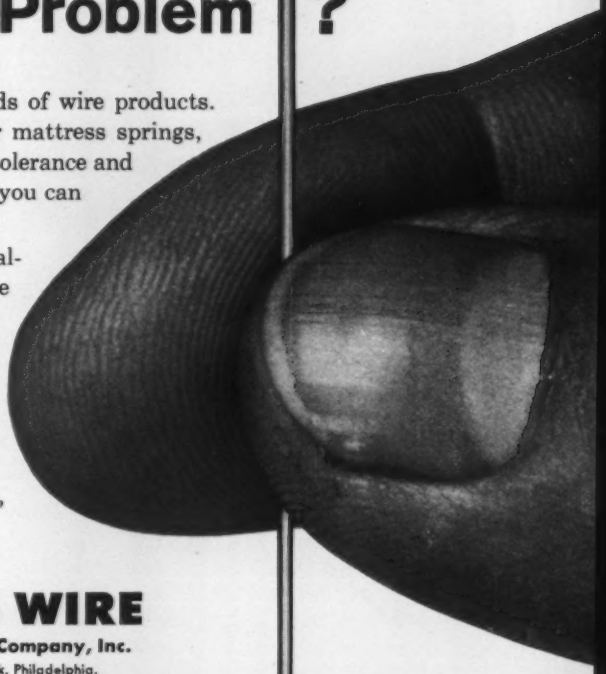

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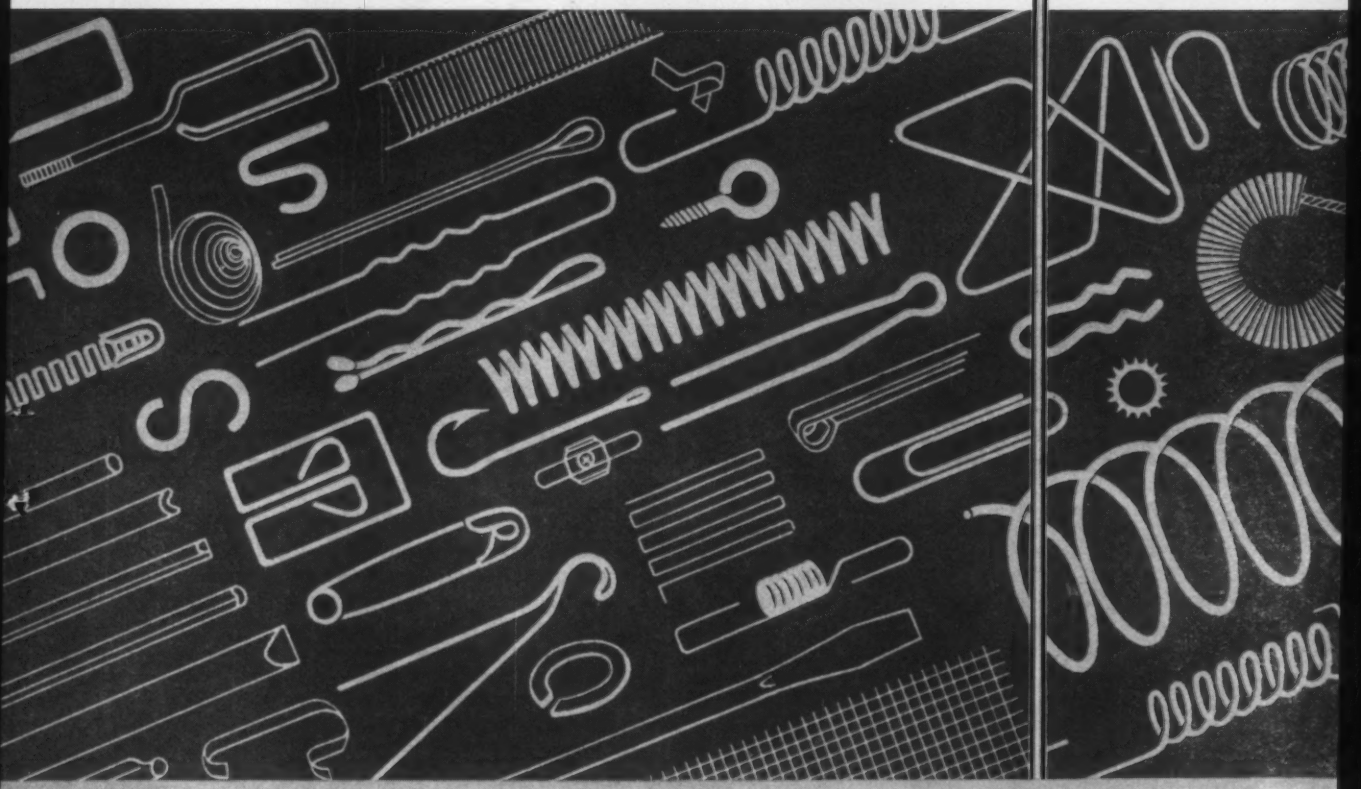


PAGE *—the source for answers to wire problems*

Complete ductwork system of new Humble Oil Building is . . .

GUARDED BY GALVANIZED STEEL

When this handsome Humble Oil office building in Houston, Texas, is finished in 1962, it will be the tallest building west of the Mississippi River. All 44 floors will be served by galvanized steel ductwork. That's 700 tons of skin-tight zinc-coated steel—a combination of tough durability and excellent corrosion protection with the broadest economy east *or* west of the Mississippi River. Galvanized steel's economy starts with fabrication, continues with erection and installation and is perpetuated in what little maintenance is required after that.

WEIRKOTE® IN PARTICULAR!—That's the choice of Mr. Harold W. Looney, owner of Looney's of Texas, Inc., sheet metal contractor, for all 700 tons of ductwork in this new building. To the inherent strength of steel—to its economy, versatility and advantageously low expansion/contraction rate—Weirkote adds flawless fabrication and long-lasting corrosion protection. Chip-free, crack-free, peel-free Weirkote is manufactured by two National Steel divisions, Weirton Steel and Midwest Steel. Write Weirton Steel Company, Weirton, West Virginia, for further details.

MIDWEST STEEL
Portage, Indiana

WEIRTON STEEL
Weirton, West Virginia

divisions of
NATIONAL STEEL CORPORATION

Electronic parts courtesy Judson Mfg. Co., Inc., Cornwells Heights, Pa.

Mirror-bright without polishing, after switch to Sunicut

Boring on a multiple-spindle automatic produced the finish you see on these electronic parts. Sunicut 102-S Cutting Oil saved time and money by eliminating the polishing operation. The same automatic uses Sunicut 102-S to machine metals ranging from titanium to stainless 410.

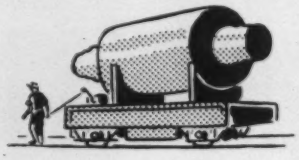
Sunicut 102-S is one of a full line of cutting oils known throughout metalworking for maintaining long tool life, close tolerances, and fine finishes. There's a grade of Sunicut that can help you improve your product quality—and *that's* the best economy of all.

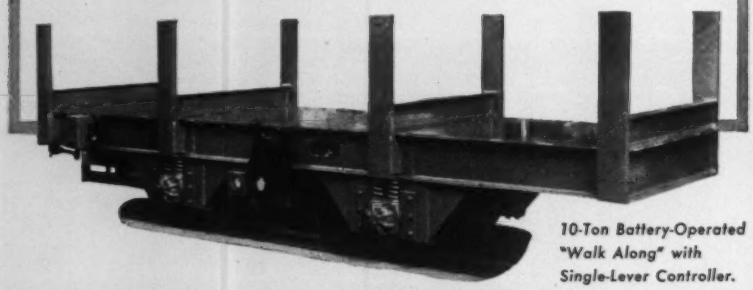
To choose the right Sunicut, ask the Sun man; that's part of his service to you. Or write to SUN OIL COMPANY, Dept. S-2, *Philadelphia 3, Pa. In Canada: Sun Oil Company Limited, Toronto and Montreal.*

SUNOCO

MAKERS OF FAMOUS CUSTOM-BLENDED BLUE SUNOCO GASOLINES

Safety-type Transfers





10-Ton Battery-Operated "Walk Along" with Single-Lever Controller.

ATLAS "walk-alongs" handle your big loads with BIG savings

Altas Safety-Type Transfers are custom designed in any capacity, with single or double-end platforms or for popular "walk-along" service. Safe because there is only one control lever and the car moves only when the operator holds lever.

Battery Operated Roll Transfer Car

SPECIAL FEATURES . . . Deck and cradle arrangements designed for load-handling convenience. Optional power includes Storage Battery • Gas-Electric • Diesel-Electric • Cable Reel AC • Cable Reel DC • Cable Reel AC with fluid coupling • also remote control with no trailing cable.

Request Bulletin 1283

ATLAS CAR & MFG. COMPANY

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CALENDAR
OF MEETINGS

Feb. 20-22, American Management Association: General management conference, Hotel Olympic, Seattle. Association's address: 1515 Broadway, New York 36, N. Y.

Feb. 23, Cutting Tool Manufacturers Association: Annual meeting, Harmonie Club, Detroit. Association's address: 416 Penobscot Bldg., Detroit 26, Mich. Executive secretary: Martin J. Ewald.

Feb. 23-24, Alloy Casting Institute: Winter meeting, Boca Raton Hotel, Boca Raton, Fla. Institute's address: 1001 Franklin Ave., Garden City, N. Y. Executive vice president: E. A. Schoefer.

Feb. 26-Mar. 1, American Institute of Chemical Engineers: 44th national meeting, Hotel Roosevelt, New Orleans. Institute's address: 25 W. 45th St., New York 36, N. Y. Secretary: F. J. Antwerpen.

Feb. 26-Mar. 2, Metallurgical Society of AIME: Annual meeting, Ambassador and Chase-Park Plaza Hotels, St. Louis. Society's address: 29 W. 39th St., New York 18, N. Y. Secretary: R. W. Shearman.

Feb. 27-Mar. 1, Association of Iron & Steel Engineers: Western meeting, Hotel Statler-Hilton, Los Angeles. Association's address: 1010 Empire Bldg., Pittsburgh 22, Pa. Managing director: T. J. Ess.

Mar. 5-8, American Road Builders Association: Annual convention and exhibit, Chalfonte-Haddon Hall, Atlantic City, N. J. Association's address: 600 World Center Bldg., Washington 6, D. C. Executive vice president: L. W. Prentiss.

Mar. 5-9, American Society of Mechanical Engineers: Gas turbine power conference and exhibit, Shoreham Hotel, Washington. Society's address: 29 W. 39th St., New York 18, N. Y. Secretary: O. B. Schier.

Mar. 6-8, American Management Association: Data processing conference and exhibit, Statler-Hilton Hotel, New York. Association's address: 1515 Broadway, New York 36, N. Y.

Mar. 7-9, Material Handling Institute: Spring meeting of MHI and the Industrial Truck Association, Sheraton Blackstone Hotel, Chicago. Information: Hanson & Shea, 1 Gateway Center, Pittsburgh 22, Pa.

Mar. 11-15, National Association of Secondary Material Industries Inc.: Annual convention, Fairmont and Mark Hopkins Hotels, San Francisco. Association's address: 271 Madison Ave., New York 16, N. Y. Administrator: M. J. Mighdoll.

New Aircospray

DRAMATIC NEW WAY TO HARDFACE . . . RESURFACE . . . BRAZE

New Aircospray is so versatile and inexpensive that it may well be tomorrow's most profitable metal-to-metal surfacing process.

How does it work? Load powdered metal into the hopper assembly of your Aircospray equipment, and (1) Preheat prepared base metal using a gas welding torch with special tip. (2) Spray and fuse the powdered metal onto the preheated base metal. A dry carrying gas, argon, helium, nitrogen, carbon dioxide or compressed air, is used to feed the powdered alloys. In some cases pre-spraying of a thin coat of powdered metal may be necessary to prevent oxidation.

A Big Advantage: Aircospray gives you a controlled supply of powdered metal to the base material. The finished surface is smooth. Post cleaning, grinding or finishing operations are minimized because of Airco's exclusive vibrator dispenser and flowmeter control of gas pressure. *No caking, no turbulence* and *no flashbacks* because the powdered metal does not go through the gas stream. There is minimum powder loss and no stub-end loss, hence substantial savings are assured.

A wide variety of powdered metals and alloys have been applied successfully. These include – Aircolite hardfacing material for severe abrasion and moderate impact on farm implement equipment and Aircolay 6N for medium impact and corrosion and abrasion at elevated temperatures. These alloys are also available with tungsten-carbide for improved wear resistance.

Airco #27 alloy for the brazing of steel, cast iron, brass or bronze provides a bronze braze excellent on tubular furniture (a gas flux must be used).

For complete information on the Aircospray process call your Authorized Airco Distributor. Look in your Classified Telephone Directory under "Welding Equipment and Supplies".

AIRCO

AIR REDUCTION SALES COMPANY

A division of Air Reduction Company, Incorporated

150 East 42nd Street, New York 17, N. Y.

More than 700 Authorized Airco Distributors Coast to Coast

On the west coast–
Air Reduction Pacific Company

Internationally–
Airco Company International

In Canada–
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All divisions or subsidiaries of Air Reduction Company, Inc.

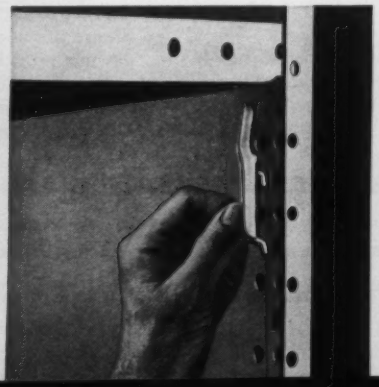
WILSON SPORTING GOODS CO., the Nation's leader in the manufacture of sporting goods equipment, used Republic METAL LUMBER in constructing 35,136 cubic feet of custom-built storage at the River Grove, Illinois, distribution center. Racks can be unbolted, bin sizes changed, intermediate pallet rests installed, quickly and easily to meet changing storage requirements.

SMALL SECTIONS OF METAL LUMBER were used as hold-down brackets to anchor the framing to the floor. No wasted material. Republic METAL LUMBER is ideal framing material for building strong and sturdy work benches, cat-walks, ramps, ladders, and other framing assemblies tailored to your specific needs. Bonderized finish reduces maintenance costs, too.

REPUBLIC STEEL LOCKERS give change, wash, and dress centers a new look, protect employee valuables and tools. Available with popular locking devices. Bonderized. Republic will help you with your locker planning, and assume full responsibility for installation. Send coupon.

REPUBLIC CLIP SHELVING is designed to ease and speed erection, to provide quick rearrangement of parts without disassembling the unit. Strong, sturdy, rigid installation every time. Compression type clip securely holds shelf in place without bolts or special adapters. Write today.

REPUBLIC MATERIAL HANDLING UNITS save time, simplify stack, store, ship operations. Heavy duty stacking brackets and corrugated construction combine to deliver long, efficient safe service at low per year cost. Republic material handling specialists work with you. Call or write.



Wilson Sporting Goods Co.
stores 1,001 sizes and shapes with

Republic METAL LUMBER

. . . building product of 1,001 uses!

How to store 1,001 different items of different sizes, different shapes, was solved by the Wilson Sporting Goods Co. by using Republic METAL LUMBER in designing a modern distribution system at their River Grove, Illinois, plant.

Wilson set up a high ceiling (22 feet), live-storage area, uncluttered by partitions and served by lift trucks. Just over four miles of .104 gage Republic METAL LUMBER was used in constructing 35,136 cubic feet of storage space, 612 feet of racks 16½ feet high, bins 3- and 4-feet deep.

According to Wilson's warehousing experts, this system gives them more usable storage space, plus safety for both men and merchandise. The hazards of pallet-load piled on pallet-load of the old system were eliminated.

METAL LUMBER is easy to use. Simply measure, cut, assemble. Engineered pattern of slots speeds erection, reduces time and material costs. Available in two gages, two widths, in standard bundles of 10- or 12-foot lengths. Call your Republic representative. Or, send coupon for attractive brochure.

ADDED STRENGTH was achieved by splicing small lengths of METAL LUMBER to framing members. METAL LUMBER is never obsolete. Its cut-and-join simplicity makes quick assembly possible even with unskilled labor. Its reusable features further reduce costs. Republic METAL LUMBER may be your answer to difficult framing problems. Try a bundle and see.

WILSON'S SOLUTION to more storage space was a pallet rack system constructed of Republic METAL LUMBER. An overhead trolley chain running around a perimeter aisle pulls floor trucks to the main aisles. Lift trucks are used to stack and store, and load and ship orders from the more than 1,000 different items on the shelves. Service, efficiency, economy.

REPUBLIC STEEL

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World's Widest Range
of Standard Steels and Steel Products

STRONG . . . MODERN . . . DEPENDABLE

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Please send more information on the following products:

☐ Republic METAL LUMBER® ☐ Republic Steel Lockers
☐ Clip Shelving ☐ Republic Material Handling Units
☐ Have representative call

Name_____ Title_____

Firm_____

Address_____

City_____ Zone____ State_____

Portable "service center"

Hundreds of companies have saved money, improved products and cut production waste as the result of opportunities presented by the Ryerson "Metalogikit."

How? This unique kit is a veritable portable service center... lets you explore many alternatives to material you now use. For example, you can compare several different cutting methods on the same piece of steel to see which is best for your application.

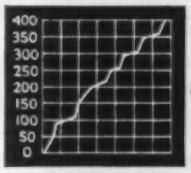
Following are a few random examples showing how Ryerson specialists, using the Metalogikit, have helped customers with a variety of problems—many similar to those you may face every day.

If you would like to put the Ryerson Metalogikit to work for you, call your Ryerson representative for a demonstration—for unbiased recommendations on steel, aluminum, plastics and metalworking machinery.

sparks new ideas and savings

KIT SPOTS SAVINGS

Scratches and grooves normal to cold drawn, seamless tubing caused high manufacturing costs for a company making small, light-wall hydraulic cylinders. The small I.D. had to be honed to eliminate these faults—often too much metal was removed for proper piston fit. A Ryerson specialist suggested a switch to *welded tubing*. Using a sample from his Metalogikit, he pointed out the better finish that eliminates expensive honing. The switch was made with these results: higher production, low reject rate, improved product—plus lower purchase price per foot of tubing.



METALOGIKIT TURNS UP 400% PROFIT

Bidding on a routine job was delayed for one steel fabricator because of an unusual material requirement in the specs—calling for an insulating block of phenolic laminate. For help, the company turned to its Ryerson representative, who showed a sample of Ryertex® sheet stock from his Metalogikit. In addition to having the material available from stock, he was able to show how easily it could be fabricated. This Ryerson know-how, demonstrated by the Metalogikit, enabled the customer to enter his bid on time. He got the job, and made a 400% profit.

KIT SUGGESTS PROFITABLE SPEC CHANGE

Fractures and rejects were extremely high for a manufacturer cold forming two severe bends in flat, hot rolled bars. A Ryerson specialist examined the ¾″ x 2″ bar stock and compared it with a sample of M-1020 flattened round bar from his Metalogikit. He explained how controlled carbon of Ryerson M-1020 bar would produce great cost-saving advantages in this operation over hot rolled, mild steel. After specs were changed to this Ryerson-supplied bar, fractures and rejects were substantially reduced—resulting in new profitability.

STAINLESS FROM KIT LEADS TO SAVINGS

This company had an emergency requirement for stainless sheets. Application had always called for Type 304, 16 ga. x 66″ x 81″, *polished on one side*. Their Ryerson specialist questioned the need for polishing. From his Metalogikit, he showed them a sample of 304 with a 2B finish. The company readily agreed it was exactly the finish needed *without polishing*—saving delivery time and material cost. The Ryerson man further suggested 16 ga. x 72″ x 144″, using the cut-off pieces for another job—reducing scrap waste on *both* requirements. Order was placed and delivered in plenty of time. Over-all result: a substantial saving.

METALOGICS
RYERSON PLUS VALUES

STEEL • ALUMINUM • PLASTICS • METALWORKING MACHINERY

RYERSON STEEL

Joseph T. Ryerson & Son, Inc., Member of the INLAND® Steel Family

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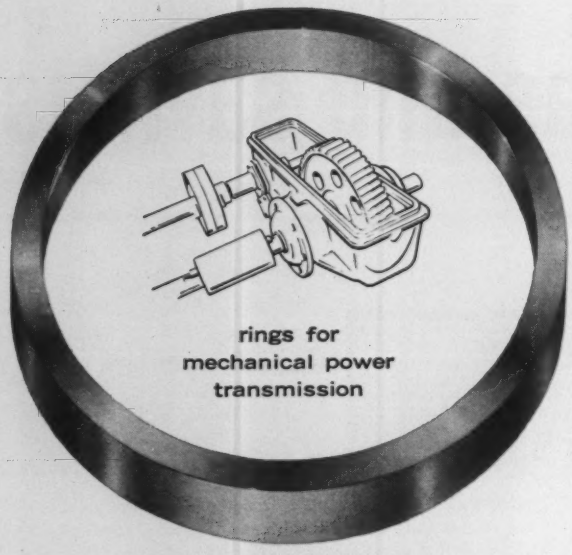
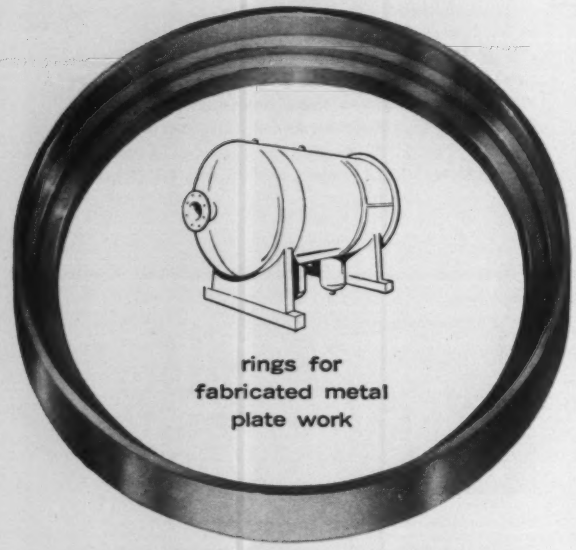
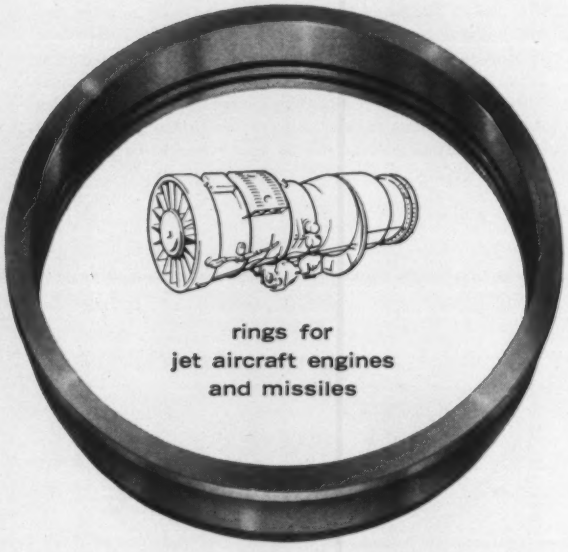


rings for
mechanical power
transmission

rings for
construction equipment
and machinery



rings for
fabricated metal
plate work



rings for
jet aircraft engines
and missiles

we make rings-you save money

Amweld flash butt-welded rings provide a welcome cost reduction opportunity for almost any manufacturer using rings of between four inches and eight feet in diameter from most of the common and exotic alloy metals. Amweld rings save on material because rings are formed closer to finished dimensions. Amweld rings save on machining, because the metal is left out—not hogged out.

Amweld customers saved over one million dollars last year. By close cost evaluation of circular components and assemblies, flash welded rings were introduced enabling substantial savings. It doesn't cost you to think on paper with Amweld. Let us quote you for your cost comparison. Write today: The American Welding & Manufacturing Company, 800 Dietz Road, Warren, Ohio.

AMWELD®
INDUSTRIAL PRODUCTS

THE AMERICAN WELDING & MANUFACTURING CO., WARREN, OHIO

STEEL
The Metalworking Weekly

Metalworking Week®

February 13, 1961

Freeze Water with Power from Flashlight Batteries

Power from two flashlight batteries is enough to freeze water using a new thermoelectric device developed at Hughes Aircraft Co. When a switch reverses the current flow, the device becomes a heater. The key to the high efficiency of this thermoelectric unit (the size of a paper clip) is a new fabricating method developed by Hughes. The firm claims it has developed a heating efficiency up to eight times that of conventional resistance heaters, like electric toasters.

Zenith Device Photographs Bullet in Flight

Zenith Radio Corp. has developed a device which takes high speed, x-ray movies of rapidly moving components inside metal cases. Other examples: Burning patterns of missile fuels, flow of blood in a person's extremities, a bullet traveling at 4000 ft per second, ultra-high-speed machining. STEEL will give more details next week.

Our Fight for the Buying Dollar

Metalworking is losing its traditional share of the total buying dollar. Measured in one way, we've forfeited $10 billion worth of sales in the last three years. The loss is one reason for the relentless profit pinch. "So great is the squeeze that there just isn't enough profit to do all of the things that profits should be doing in this country," says Roger Blough, chairman, U. S. Steel Corp. Needed are sound, long term, approaches to customer satisfaction. Mr. Blough and others suggest the route on Page 73.

New Furnace Drives Its Own Fan

A gas furnace that drives its own blower with power from a 130-watt thermoelectric generator is in the final phase of development at C. A. Olsen Mfg. Co., Elyria, Ohio. It will offer improved reliability (it's not dependent on an outside electric power source), lower installation costs (no electrical connections are needed), and lower operating costs (savings in the monthly electricity bill).

New Maser Offers Five Big Benefits

Bell Telephone Laboratories has unveiled an optical-electronic device, called a continuously operating, gaseous, optical maser, that offers five big commercial benefits: 1. In communication, it generates an infrared beam that will carry up to 1 million simultaneous telephone conversations. 2. In space, it can send information for millions of miles. 3. For industry, it is a convenient source of controllable heat that can be finely focused to produce tem-

peratures in millions of degrees. 4. For the military, it offers promise of aiming communication channels so accurately that they will be practically impossible to intercept. 5. For measuring, the maser is a cheap, precise standard.

Romney Suggests No Tariffs on Equal Exchanges

George Romney, president, American Motors Corp., has suggested that an international economic "bridge" be built to permit tariff-free exchange of production between foreign and domestic firms. His plan would limit such exchanges to exactly equal production values flowing in each direction. Outside that interchange, the usual restrictions would apply, he said. Mr. Romney made the proposal at a joint meeting of the Empire Club and the Canadian Club in Toronto, Ont.

Chrysler Sets New Supplier Policy

Chrysler Corp. has adopted a set of rules to govern relations between employees and suppliers and has set up a top management committee to police the rules. Employees will be permitted to hold interests in supplying firms only if the committee feels such connections do not conflict with the carmaker's best interests. And employees must get the committee's consent before giving their services to any outside concern.

Two Firms Expand Rebar Facilities—Despite Foreign Inroads

Bethlehem Steel Corp. has opened a new, reinforcing bar production facility in the face of severe foreign competition that sometimes undercuts U. S. products by $25 a ton. In the photo, a worker bends a bar to the customer's specifications. In a similar move, Florida Steel Corp. has just awarded a contract for the erection of a new mill to make rebars and other structural items. It'll be built near Charlotte, N. C. For a peek at the Bethlehem operation, see Page 112.

Engineer Demand Drops

Demand for engineers and scientists fell sharply in December, a survey by Deutsch & Shea Inc., New York, finds. The firm's index, based on recruitment advertising volume, fell to 78.9 in December from 113.3 in November and 100 last July. The firm says the drop is mostly seasonal.

Anaconda Jumps into Juice Can Fight

You probably can't find a fiercer fight for a market than the one among suppliers of containers for frozen orange juice concentrate. Last week, Anaconda Aluminum Co. jumped into the fight with both feet. The firm's entry is a spiral wound aluminum foil can, produced by R. C. Can Co., St. Louis. It uses laminated aluminum foil in place of the conventional tin

plate or aluminum sheets. Anaconda claims its package will bring about initial savings of 20 per cent over the conventional, 6 ounce, tin can and 14 per cent over an aluminum can with tin plate ends. It says additional savings of 4 to 10 per cent are possible in shipping.

Making Rail Cars to Launch Missiles

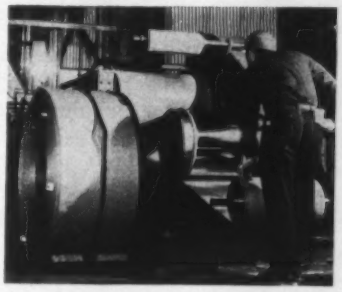
Workers hold a model of the railroad car that will launch Minuteman ICBMs, as other workers put finishing touches on the full scale car in the background. The Berwick, Pa., plant of ACF Industries Inc. is making the cars. Boeing Airplane Co. will outfit them with launching gear. American Machine & Foundry Co. helped design them.

Aluminum Industry Celebrates Diamond Jubilee

Oberlin (Ohio) College will be the scene of the aluminum industry's 75th anniversary celebration. Charles Martin Hall perfected his reduction process (which started the aluminum industry) in 1886 while he was a student at Oberlin. He worked in the family woodshed, using wet cell batteries he borrowed from the college's chemistry lab. Today, six U. S. primary producers operate 22 reduction plants that are based on the principle he discovered.

Stainless Producers Launch All-Out Attack

Look for a dynamic year in stainless steel despite static shipments (around 570,000 tons, about the same as the annual average since 1957). The big news will be technological: A headlong flight to bright annealing. Automotive buyers have been so delighted by the new product that they have been ordering all they can get. Capacity is climbing fast. See Page 145.



Tappan Cuts Prices on Electronic Ranges

Tappan Co. has lowered prices and extended warranties on its new line of electronic kitchen ranges. The firm has set a suggested retail price of $795 on its new unit—$100 below the 1960 figure and $400 under the first model. marketed in 1954. The warranty has been extended to two years from one.

300 Communities Have Iron and Steel Plants

The U. S. iron and steel industry today consists of more than 275 companies with plants in 300 communities in 35 states, the American Iron & Steel Institute reports. About 85 make raw steel; the others roll and draw semifinished steel or produce pig iron, says AISI. Competition is keen. For example, about 75 firms make tubular products; 55 make wire and wire products; 37 make concrete reinforcing bars. Twenty or more types of finished steel mill products

STEEL
The Metalworking Weekly

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are made in six states: Pennsylvania, Indiana, Illinois, Ohio, California, and New York.

Thermoelectricity Gets Another Job

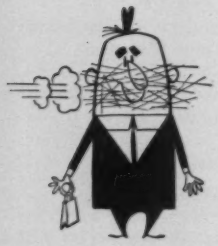
The Air Force is giving strong indications that it will be putting thermoelectric devices to work in many areas soon. Latest example: A portable thermoelectric generator, using a nuclear heat source, is being tested to supply power for unmanned radio beacons and weather stations. Developed by Westinghouse Electric Corp., the unit produces 150 watts from the heat of radioactive isotopes.

Coming: Trains of Trucks

Truck trains will be operating on superhighways in the U. S. by 1975, predicts J. C. Wagner of International Harvester Co. He says 100-ft truck trains will operate between big city terminals. They'll be powered by gas turbines or superdiesels.

Straws in the Wind

Business failures climbed to a postwar high of 400 in the week ended Jan. 26. Of the failing concerns, 46 suffered liabilities in excess of $100,000, and 71 were manufacturing firms . . . Consumers added $76 million (seasonally adjusted) to their installment debt in December vs. $188 million in November . . . The Census Bureau reports that spending on both public and private construction declined more than seasonally in January, but *Engineering News-Record* says heavy construction contracts reached a record dollar volume in January . . . Koppers Co., Westinghouse Electric Corp., United Engineering & Foundry Co., and Bechtel Corp. are surveying Nigeria to determine the feasibility of building an integrated steel mill to supply central Africa . . . The Atomic Energy Commission will build an experimental reactor at the National Reactor Testing Station in Idaho to get data on the use of gas cooled reactors for maritime and other civilian power applications . . . The average U. S. family will have an income of at least $7300 in 1965 and at least $8300 in 1970, predicts Arthur Upgren of Macalester College . . . More than 125 entries, a record number, have been received by the Miniaturization Awards Committee . . . The Export-Import Bank of Washington granted Japan a $25 million credit to buy U. S. machine tools and forging, rolling, and woodworking equipment.



Metalworking Pulse

The Business Trend: Cold weather and the attendant rise in electric power consumption have sustained the industrial production index at the November-December level of about 150 (1947-49 = 100). **Autos:** Production has been sliding since early in January and there is no immediate hope the downtrend will be braked. First quarter output will likely be the lowest for that period since 1952. **Steel:** Ingot output will continue close to 1.5 million tons a week for a while.

- **INDUSTRIAL PRODUCTION INDEX** (1947-49=100)
  - Week ended Feb. 4 ..... 149†
  - Year ago 180
  - Details on Page 83
- **PASSENGER CAR OUTPUT (UNITS)**
  - Week ended Feb. 11 . 92,000*
  - Year ago 153,186
  - Details on Page 80
- **STEEL INGOT OUTPUT (TONS)**
  - Week ended Feb. 11 . 1,500,000*
  - Week ago 1,492,000
  - Details on Page 152

†Preliminary. *Estimated.

Roebling high carbon flat spring steel is used for a wide variety of parts.

Consistent Quality Has Benefits for You

The reputation of Roebling high carbon flat spring steel is based on two uncompromising facts: its unexcelled dimensional and mechanical uniformity.

They are qualities that contribute immediately and directly to *your* increased production rates and decreased rejects.

You are taking advantage of a collection of benefits when you specify Roebling. Write Roebling's, Wire and Cold Rolled Steel Products Division, Trenton 2, New Jersey, for complete information.

ROEBLING

Branch Offices in Principal Cities
John A. Roebling's Sons Division • The Colorado Fuel and Iron Corporation

Roebling... Your Product is Better for it

Alabama Metallurgical Corp., Selma, Ala.: High-purity magnesium ingots ready for shipment; ALAMET also produces commercial and alloy grades.

L&N control facilitates magnesium reduction...

. . . at Alabama Metallurgical Corp., Selma, Ala., where thirty Electromax® controllers helped them swing into full production after only a few months of operation. Magnesium at this new plant is produced from briquettes of CaO, MgO, FeSi and CaF_2 which are reduced at 2150 F in evacuated retorts. Since startup in late 1959, Electromax has been consistently holding retort temperatures within ± 5 F. Additional instrumentation includes Speedomax® H which is recording flue and feed-zone temperatures of the lime burner kiln, and controlling temperatures of magnesium bath for casting into ingot and pig. You'll find L&N instruments providing equally dependable control for thousands of applications where heat is used . . . helping to produce both process economies and a quality product. When such significant savings stem from such a modest investment, *it pays to get the best.* For details about L&N controls for modernization or expansion, contact your nearest L&N office or write 4957 Stenton Ave., Phila. 44, Pa.

LEEDS Instruments **NORTHRUP** Automatic Controls • Furnaces

With Electromax holding retort temperatures within ± 5 F, Speedomax G multiple-point recorders provide a permanent record of furnace temperatures.

When you think of PRECISION

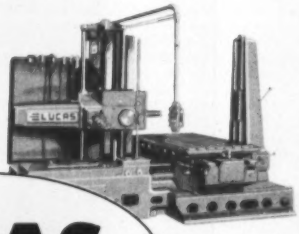
For life time precision Lucas provides

airlift to saddle

and table.

These elements are supported on a thin film of lubricated compressed air during traverse. This separation of metal from metal virtually eliminates wear. During machining cycles the saddle and table are automatically clamped down tight to provide absolute rigidity for even the heaviest cuts. Unclamping is automatic, too. These are two aspects of Lucas design which contribute to the precision of these machines. Lucas Machine Division, The New Britain Machine Company, 12302 Kirby Avenue, Cleveland, Ohio. When you think of Precision . . .

think of . . .



LUCAS
PRECISION

When you think of RELIABILITY

Lucas automatic power positioning

automatically repeats

automatically repeats

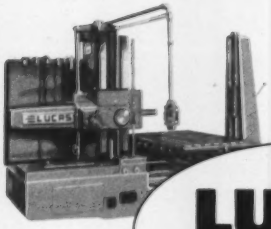
automatically repeats

to ±.0001 . . .

A simple, completely reliable system of dial indicators, end measures, and electrical controls automatically disengages rapid traverse, engages the fixed, constant-rate power feed and precision stops the unit at predetermined settings. Automatic power positioning assures the highest order of repetitive accuracy with an absolute minimum of operator attention.

A new catalog describes our complete line of horizontal boring, drilling and milling machines. Write Lucas Machine Division, The New Britain Machine Company, 12302 Kirby Avenue, Cleveland, Ohio. When you think of Reliability . . .

think of . . .



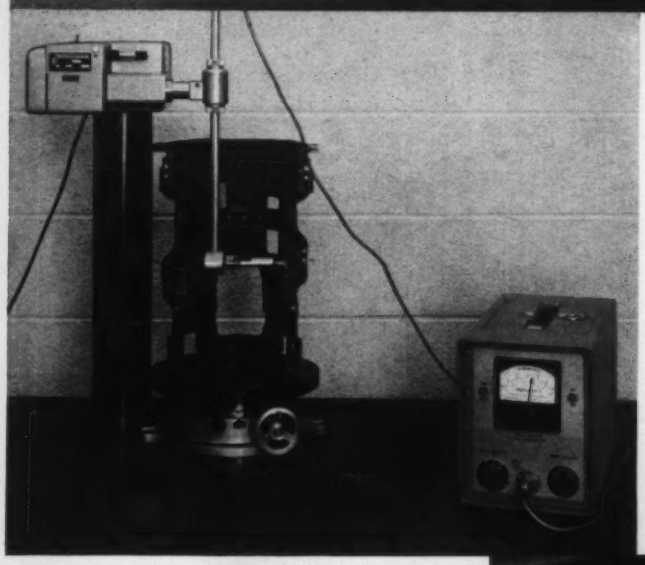
LUCAS
PRECISION

BREAKING MEASUREMENT BARRIERS WITH MICROMETRICAL

HOW TO SEE A SHAPE IN MILLIONTHS

To assure desired quality, a manufacturer needed to production-check the crown of tapered roller bearing components in millionths of an inch. Electronic indicators proved inadequate; so they came to Micrometrical. The result is the Microcorder® setup shown.

With the work positioned on a sine plate, a positive-displacement Tracer moves across the raceway, and a recorder draws a magnified profile of the surface. Each ¼" division on the chart represents a vertical distance of .000100" or .000025", as desired; so the contour is readily scaled in millionths. The equipment is used in the grinding room—for checking bearing cups, cones and rollers. BULLETIN LT40 gives details. Write for it!



FOR BOOM WITHOUT BUST—

In the Vulcan aircraft cannon, an internal cylindrical cam surface is critical to performance; and the manufacturer has to measure the roughness of this surface at many places. To do so quickly and easily, he uses the Profilometer® setup at left. This includes (1) a standard Linear Pilotor mechanism on an extra-high column; (2) a special Tracer (at bottom of vertical tube) that positions itself to all slopes of the cam; and (3) a standard Amplimeter, which shows the roughness height in microinches (arithmetical or RMS average). Ask for BULLETIN LT41.

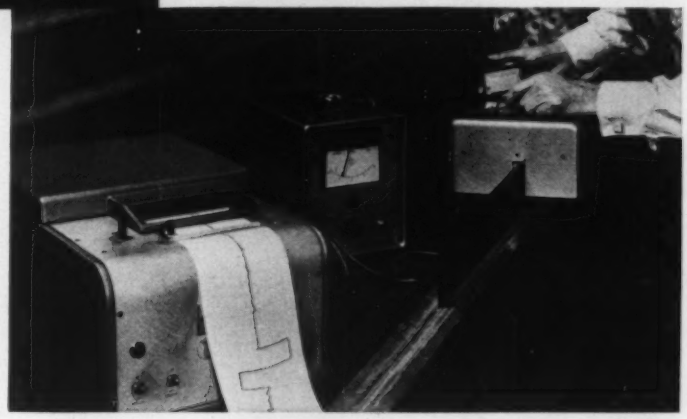
Bring YOUR surface measurement problems to

MMC® MICROMETRICAL MANUFACTURING COMPANY
3621 S. STATE RD. ANN ARBOR 13, MICHIGAN

Manufacturer of the PROFILOMETER® • PROFICORDER® • MICROCORDER® WAVOMETER® • ANDEROMETER® • VAROMETER®

SELF-PROPELLED THICKNESS CHECKER

The Microcorder® equipment at right is filling a steel mill's need for rapid edge-to-edge thickness checking of rolled steel. A self-propelled Pilotor with built-in Tracer moves along a sample strip, while a recorder draws a continuous chart that shows the size, shape and location of variations from nominal thickness. This is much faster, more accurate and more complete than previous methods—takes only 60 to 90 seconds for a 96" strip—and permits a 60% reduction in rejects caused by ridges. BULLETIN LT42 gives details. May we send you a copy?



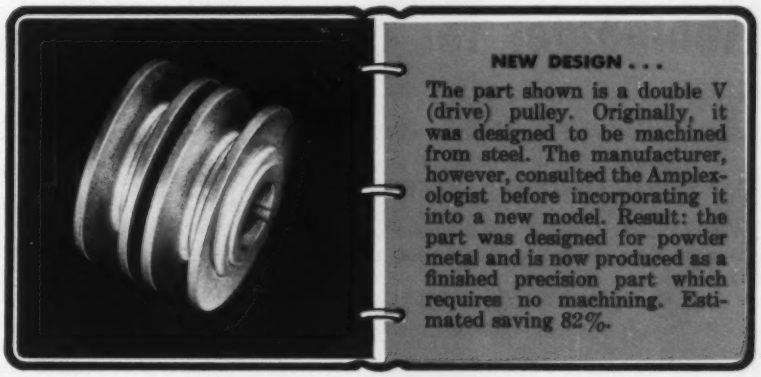
THE AMPLEXOLOGIST

. . . IS ADMITTED TO MANY SECRETS!

Many manufacturers have found it pays *not* to guard some secrets too closely. Especially from the Amplexologist. True, manufacturers are usually reluctant—the first time—to show the Amplexologist new model plans and prototypes *before* the design is final. But only the first time.

Why? Well, first of all the Amplexologist is no blabbermouth. He looks but doesn't talk. And what he sees can help cut costs. For example: *how to make this part, this part, this one and maybe this one, too, through advanced powder metallurgy—and save thousands of dollars in machining costs. Often improve the product at the same time.*

Well, secrets are fun but money is more so. That's why hundreds of manufacturers—in order to take full advantage of powder metallurgy before production begins—happily share their secrets with the Amplexologist. Their confidence has helped make us the world's largest and most experienced producer of powder metal parts. Another reason why leading manufacturers say: **When it comes to powder metallurgy—Amplex has the answer.**



NEW DESIGN . . .

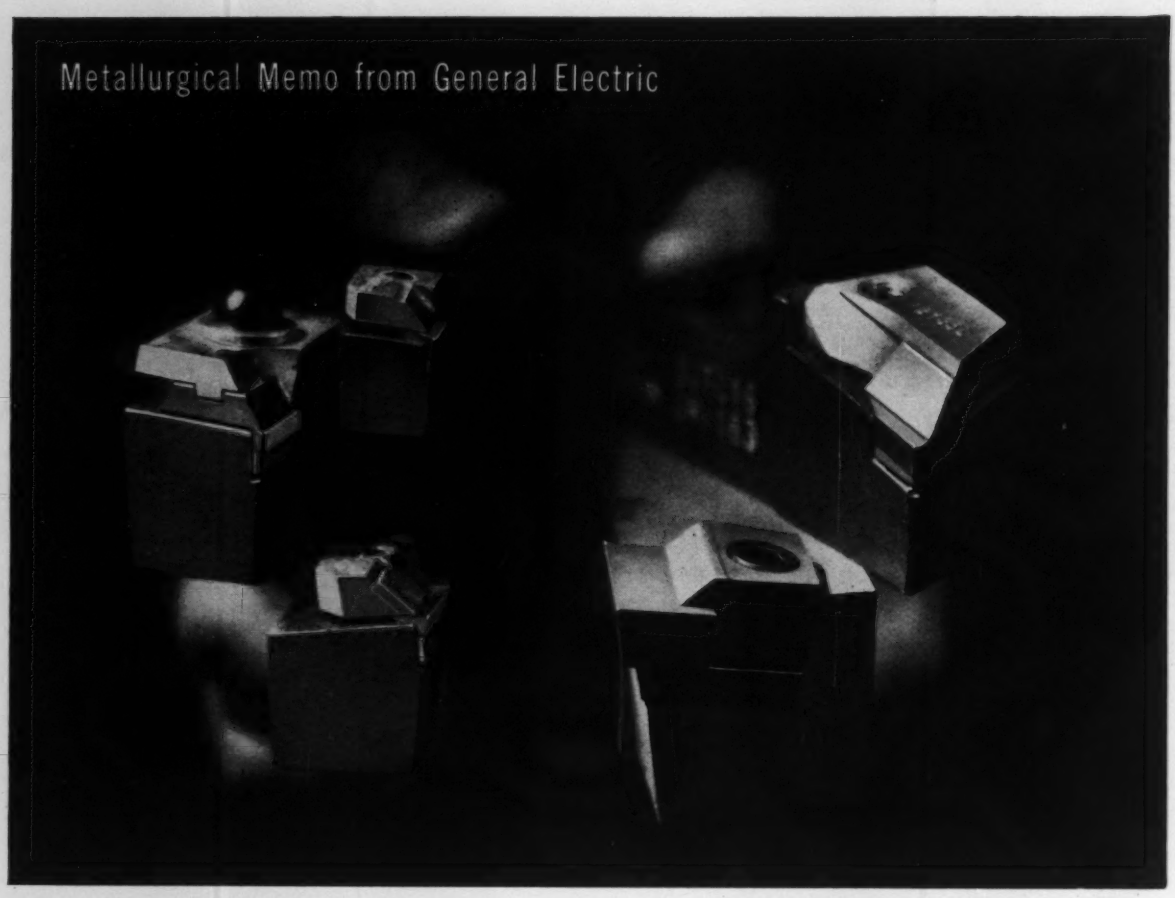
The part shown is a double V (drive) pulley. Originally, it was designed to be machined from steel. The manufacturer, however, consulted the Amplexologist before incorporating it into a new model. Result: the part was designed for powder metal and is now produced as a finished precision part which requires no machining. Estimated saving 82%.

AMPLEXOLOGIST

AMPLEX

DIVISION CHRYSLER CORP.
DETROIT 31, MICHIGAN

A CHRYSLER OILITE® PRODUCT



Pick the one you need . . . there's a G-E Carboloy toolholder for every metalcutting purpose

Designed to do a better job more efficiently, Carboloy toolholders help you get
BETTER PROFITS THROUGH BETTER TOOLING

Even the very finest cemented carbide inserts (Carboloy carbides) can't do a decent machining job if the toolholder is inferior.

That's why the Metallurgical Products Department of General Electric has evolved a line of toolholders to do a superior job in every metalcutting operation. Carboloy toolholders get the mileage out of inserts . . . take the headaches out of machining.

Choose from: Lift-O-Matics, with self-raising chip-breaker clamp (positive rake, negative rake – 20 styles, 186 sizes total); Adjust-O-Breakers, with the chip-breaker versatility of *many* toolholders (negative rake – 10 styles, 30 sizes); Tracers (positive rake, negative rake – 8 styles, 19 sizes total); Heavy-duty (8 styles – 10 sizes).*

These, along with the complete line of Carboloy inserts, insert seats, convertible seats, and brazed tooling, are all designed to help you attain "BETTER PROFITS THROUGH BETTER TOOLING." Check with your Authorized Carboloy Distributor today. Or write: *Metallurgical Products Department of General Electric Company, 11141 E. 8 Mile Ave., Detroit 32, Michigan.*

**Available through Canadian General Electric Company, Limited, Toronto, Ont., and through International General Electric Company Division, General Electric, International, New York, N.Y.*

CARBOLOY®
CEMENTED CARBIDES

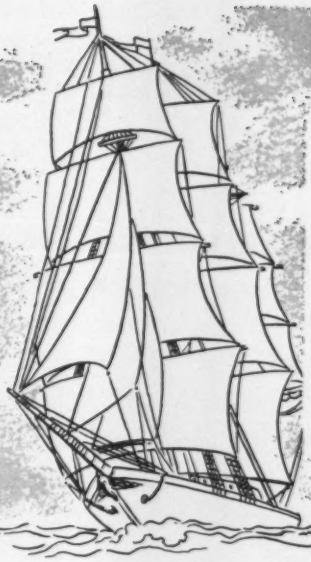
METALLURGICAL PRODUCTS DEPARTMENT

GENERAL ELECTRIC

CARBOLOY® CEMENTED CARBIDES • MAN-MADE DIAMONDS • MAGNETIC MATERIALS • THERMISTORS • THYRITE® • VACUUM-MELTED ALLOYS

Why Rust-Oleum is different—

and what this difference, backed by 35 years of industry proof, means to you!



A Sea Captain developed it . . . Industry proved it!

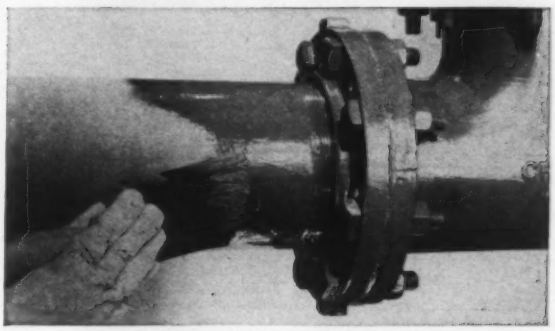
The original Rust-Oleum formula was developed nearly fifty years ago by Sea Captain Robert Fergusson, who became intrigued with the rust-stopping qualities of fish oil early in his career. Creating a *special treatment* for the fish oil, he used the *specially-processed fish oil* as the vehicle in combination with fine rust-inhibiting pigments. The result? A coating that actually *stopped rust* when applied directly over sound rusted surfaces, after scraping and wirebrushing to remove rust scale and loose rust. Possible, because the *specially-processed* fish oil penetrated the rust to bare metal. This was the birth of Rust-Oleum's *exclusive* 769 Damp-Proof Red Primer.

PROVED THROUGHOUT INDUSTRY FOR OVER 35 YEARS

Today, Rust-Oleum in its many systems and colors, has been proved throughout industry for over thirty-five years. This proof by leading industrial users is your assurance of savings in time, money, and metal. Economies made possible by the fact that Rust-Oleum 769 Damp-Proof Red Primer goes right over the sound rusted metal—usually eliminating costly surface preparations. And Rust-Oleum, in its various systems, resists rain, sun, fumes, heat, weathering, chemicals, etc., for lasting beauty over the years.

RUST-OLEUM NEW COLOR HORIZONS SYSTEM

The Rust-Oleum New Color Horizons System introduces a new coating concept to industry. It combines four important factors: (1) the ability to stop rust, (2) smart, modern color harmony, (3) the durability to last and last, (4) ease of application that saves time, money, and metal. See how this system can bring lasting beauty to your plant, machinery, equipment, pipes, tanks, structural steel, fences, etc. Write for complete information or contact your nearby Rust-Oleum Industrial Distributor. He maintains complete stocks for prompt service.



RUST-OLEUM®

There are imitations, but only *one* Rust-Oleum. It is distinctive as your own fingerprint.

STOPS RUST!®

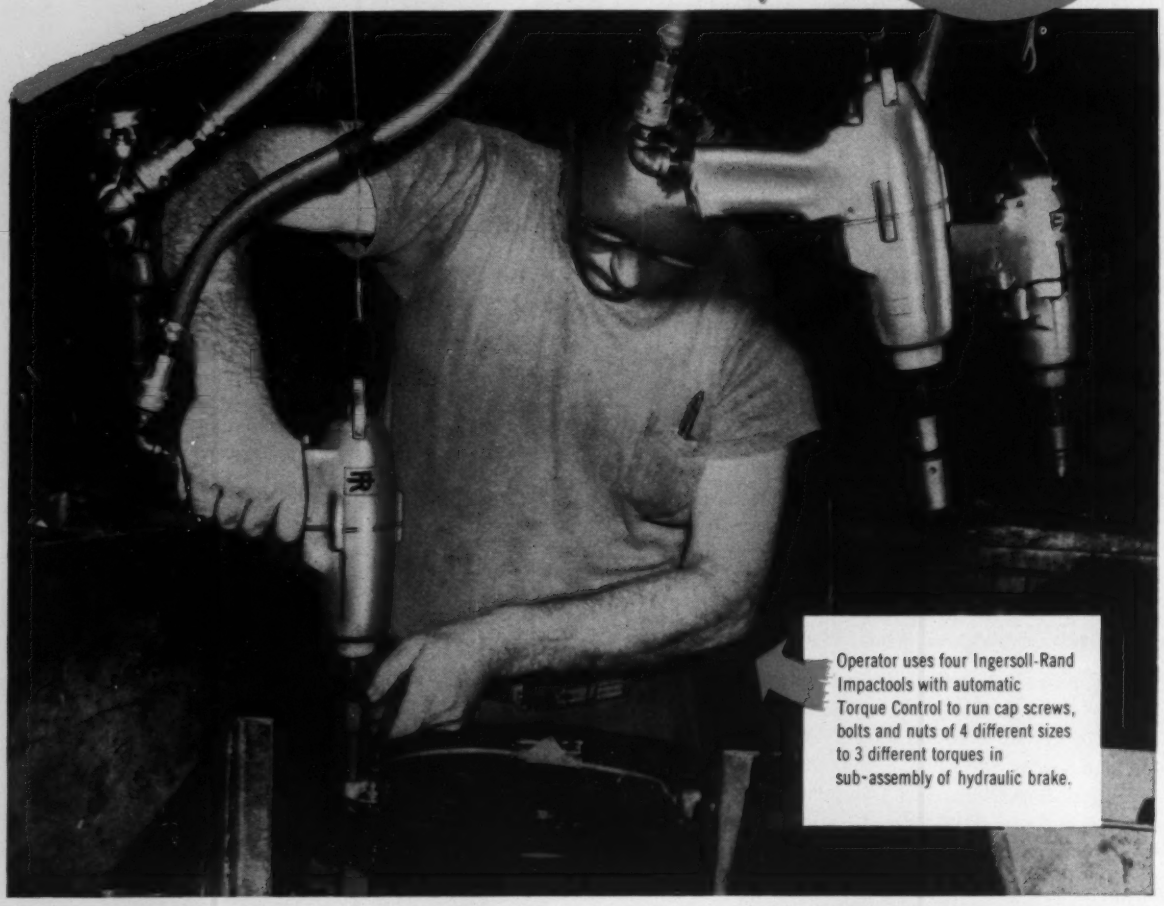
ATTACH TO YOUR LETTERHEAD

Rust-Oleum Corporation
2596 Oakton St., Evanston, Illinois

Please send me the following at no cost or obligation:

- ☐ New Color Horizons Systems Catalog featuring 110 actual color standards and 69 photo applications.
- ☐ Free test sample of Rust-Oleum 769 Damp-Proof Red Primer to be applied over sound rusted surface.
- ☐ Results of radioactive tracing study on Rust-Oleum fish oil penetration.

IMPROVE PRODUCT QUALITY PRODUCE 45% MORE AT THE SAME TIME!



Operator uses four Ingersoll-Rand Impactools with automatic Torque Control to run cap screws, bolts and nuts of 4 different sizes to 3 different torques in sub-assembly of hydraulic brake.

By replacing ordinary air and electric impact wrenches with Ingersoll-Rand "automatic shut-off" torque control Impactools, the problem of driving cap screws, nuts and bolts to 3 different and precise torques has been eliminated. Quality is assured!

At the same time . . . production on this job has increased by 34% to 45% per manhour depending on the model being assembled! And . . . this manufacturer has solved his "quality bottleneck" on 11 other operations with additional reliable high-production, Torque Control Impactools.

This extra output means a Dividend on Payroll Dollars for this manufacturer of from 34% to 45% of the operator's wages!

You can calculate your own dividend with the help of Ingersoll-Rand's new, illustrated guide-book, "How to earn a Dividend on Payroll Dollars with Planned Annual Retooling" . . . and handy Dividend Computer. Call your nearby I-R Representative or write Ingersoll-Rand, 11 Broadway, New York 4, N. Y.

Ingersoll-Rand

11 Broadway, New York 4, N.Y.

Planned Annual Retooling increases output per man

43A-8

Quality Steel

BETTER STEEL in ever-increasing quantities and varieties is needed by the world's growing industries.

YAWATA, biggest steelmaker in the Far East, has achieved its pre-eminence by concentrating on quality, dependability and low-cost production.

For your specific needs in STEEL, small or big, contact YAWATA for assured satisfaction.

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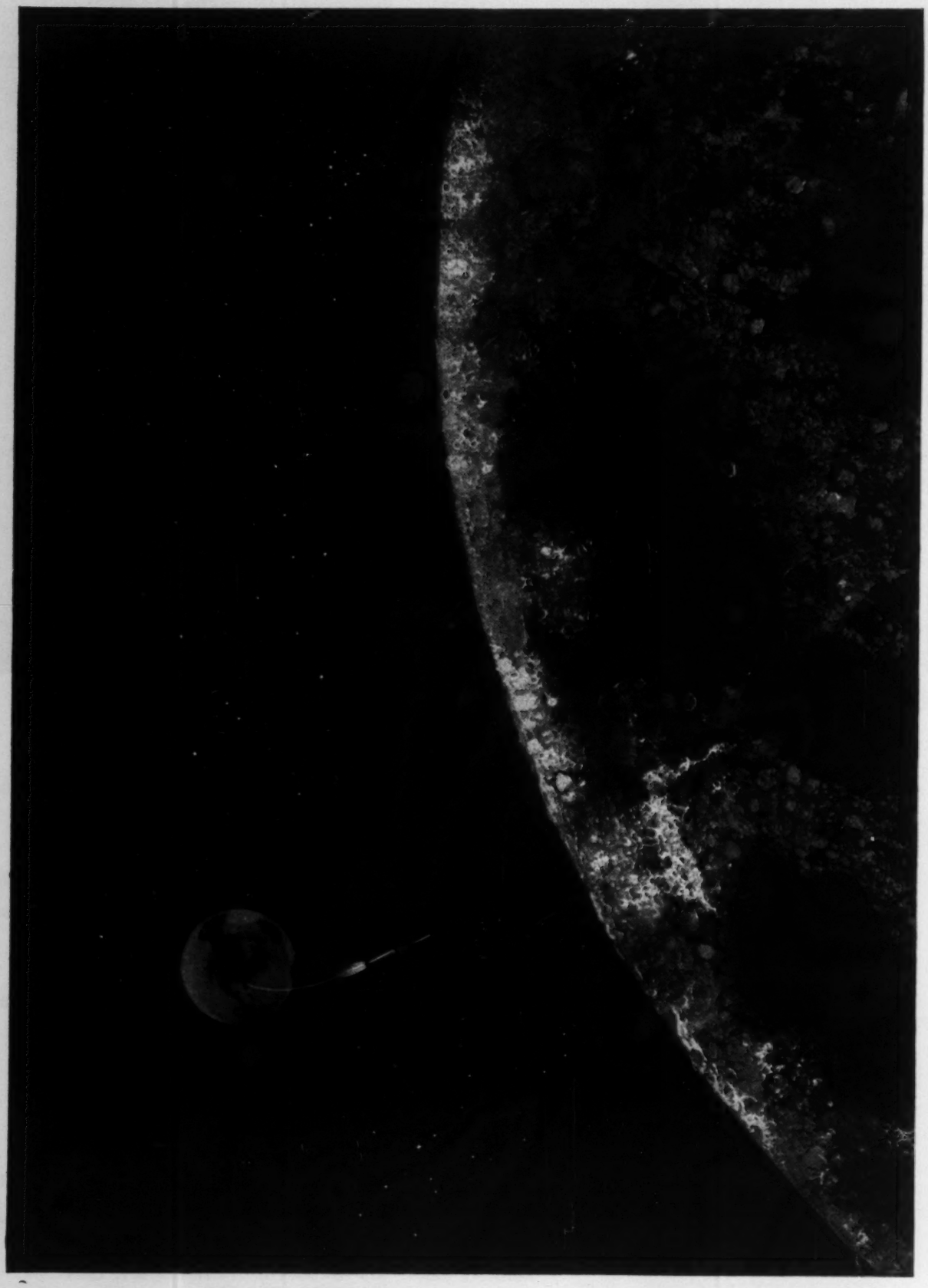

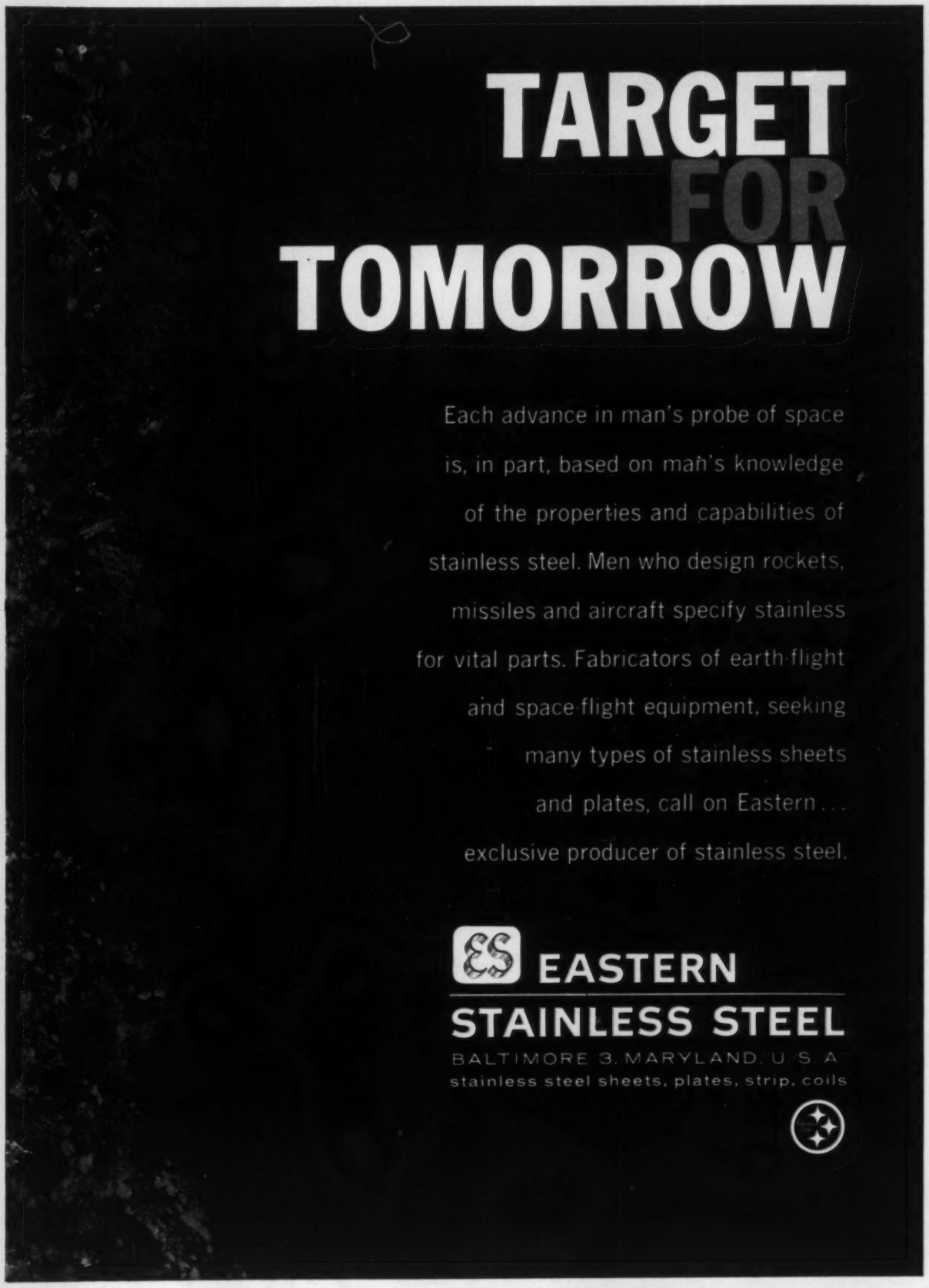
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FOR
TOMORROW
Each advance in man's probe of space is, in part, based on man's knowledge of the properties and capabilities of stainless steel. Men who design rockets, missiles and aircraft specify stainless for vital parts. Fabricators of earth-flight and space-flight equipment, seeking many types of stainless sheets and plates, call on Eastern . . . exclusive producer of stainless steel.
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STAINLESS STEEL
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stainless steel sheets, plates, strip, coils

"We pocket the difference"

The difference? Saving in floor space. No foundation cost. Quick and easy installation. The Gardner-Denver packaged air compressor goes right to work . . . provides a dependable supply of air for years. Want details? Request Bulletin WB-10.

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GARDNER-DENVER Since 1859

EQUIPMENT TODAY FOR THE CHALLENGE OF TOMORROW

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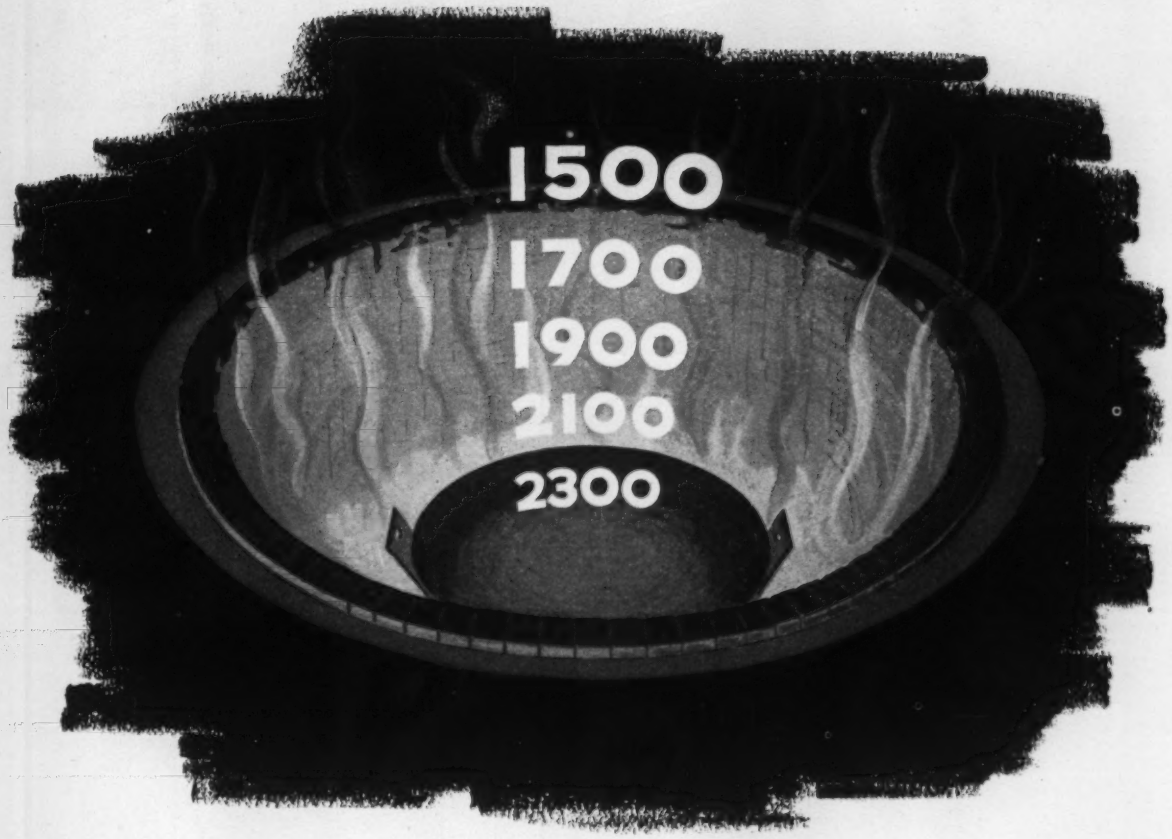

2300° HOT . . . *but not bothered!*

Retort made of HASTELLOY alloy X is removed from furnace after brazing cycle at 2300 deg. F.

RETORTS made of HASTELLOY alloy X and used for controlled-atmosphere brazing of rocket and missile parts at 2300 deg. F—last up to twice as long as retorts previously used. The alloy's high strength and resistance to oxidation and thermal shock make thinner walls possible. This in turn shortens heating cycles by 25 per cent . . . and cuts fuel costs by as much as 40 per cent.

Total savings during the 100-day lifetime of the retorts is about $1000—resulting from lower first cost, shorter heating cycles, 150 additional cycles per retort, and reduced costs for fuel and welding maintenance.

Resistance to stress, to thermal shock, to erosion, corrosion, and fatigue, are typical properties that make HAYNES alloys so extremely useful in jet engine turbine wheels, in ramjets, missiles, rockets, as well as industrial heat-treating applications.

Whether investment- or sand-cast, rolled, wrought, vacuum melted, or air melted, there's a HAYNES high-temperature alloy to meet your needs.

HAYNES ALLOYS

HAYNES STELLITE COMPANY

Division of Union Carbide Corporation
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UNION CARBIDE

Address inquiries to Haynes Stellite Company, 270 Park Avenue, New York 17, New York.

"Haynes," "Hastelloy," and "Union Carbide" are registered trade-marks of Union Carbide Corporation.

. . . Stacks of Nestaway racks show nesting, interlocking and space-saving features of racks for baked goods handling made by Mid-West Metallic Products for its affiliate, Nestaway, Inc. Rack held by Harold W. Vetter (left), Mid-West director of manufacturing, and Robert J. Adams, purchasing agent, holds 12 loaves of bread and stacks 12 high on castered base. Rack uses up to 13.3 pounds of Pittsburgh Steel Co.'s bright basic wire.

DELIVERING BREAD—BY WIRE

Pittsburgh Steel wire's uniform welding, forming properties give Mid-West Metallic extraordinary success in the manufacture of Nestaway racks

Bread and pastries are delivered better by wire. That is, by welded steel wire racks that perform double duty in handling and selling baked goods.

Mid-West Metallic Products, Inc., a fast-growing subsidiary of Rubbermaid, Inc., uses Pittsburgh Steel Company's bright basic wire to build wire shipping racks for its affiliate, Nestaway, Inc., another Rubbermaid subsidiary. In addition to the Nestaway racks, Mid-West makes more than 300 other wire formed products, using Pittsburgh Steel's bright basic and galvanized wire in a wide range of sizes.

The Nestaway racks, however, are a prime example of Mid-West's experience in using Pittsburgh Steel's .3625 and .3065 bright basic wire.

The racks are part of a complete Nestaway system for baked goods handling to and at the point of sale. The system includes interlocking wire racks, rack shelves and caster bases. It eliminates nearly all direct handling of baked goods between bakery and consumer.

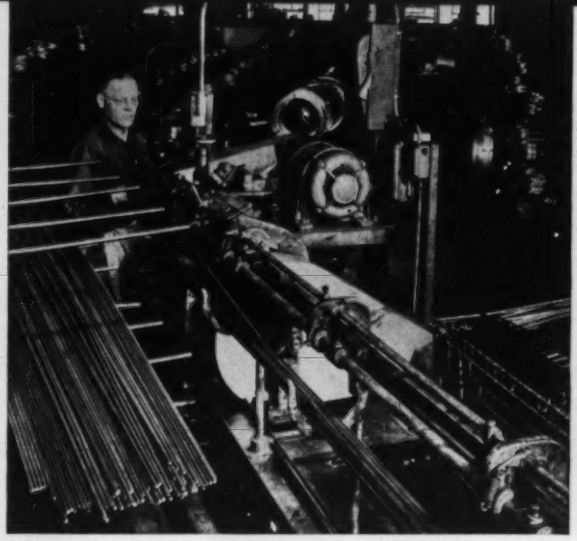
To build the Nestaway racks, Mid-West uses automated and semi-automated forming and welding equipment of its own design. This equipment requires wire with the highest possible uniform physical properties. Mid-West depends on Pittsburgh Steel for much of its wire supply because it is assured consistent, uniform quality.

• **Phenomenal Welding Success**—Made in 11 sizes ranging from 8.4 to 13.3 pounds in weight, an average Nestaway rack requires 200 welds.

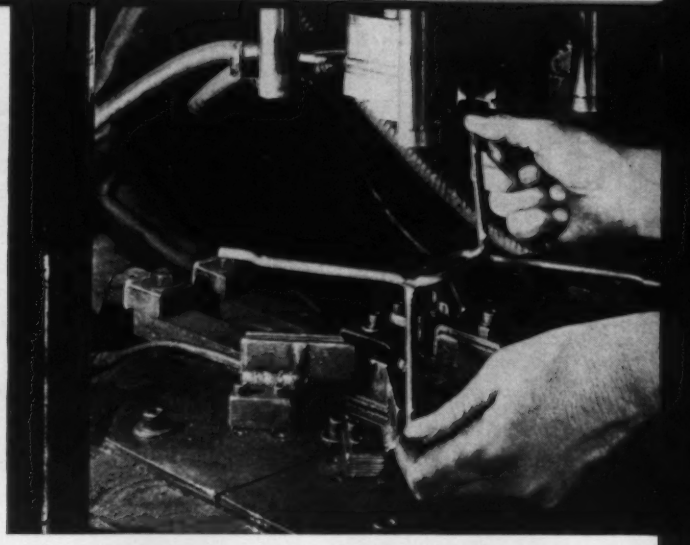
On welding, Harold W. Vetter, Mid-West's director of manufacturing, says:

"In all of our production last year, we had an extraordinarily low number of broken welds. We've had racks returned that had been accidentally crushed by trucks—but the welds were seldom broken."

Purchasing Agent Robert J. Adams adds further evidence of the



. . . From straightening and cutting through final copper-nickel-hard chrome plating, Pittsburgh Steel's wire meets Mid-West Metallic's requirements for consistent uniformity of forming, welding, coating properties.



. . . Key piece of rugged Nestaway rack—the bends and welds on "X"-shaped side supports are produced to tolerances of plus/minus .015 inch by Mid-West Metallic with Pittsburgh Steel's .3625 bright basic wire.

weldability of Pittsburgh Steel's bright basic wire, saying:

"We found Pittsburgh Steel wire would consistently hold welds when we bend the welded ends of the rack's bottom frame to form Nestaway's interlocking feature."

• **Close Forming Tolerances**—Because Nestaway racks are built to stack when loaded and nest precisely when empty, wire bends are made to unusually close tolerances. Mr. Vetter explains:

"This rack is so accurately formed that it's practically a machined product. Every bend—even over-all dimensions and some welds—is held to a tolerance of .015 inch."

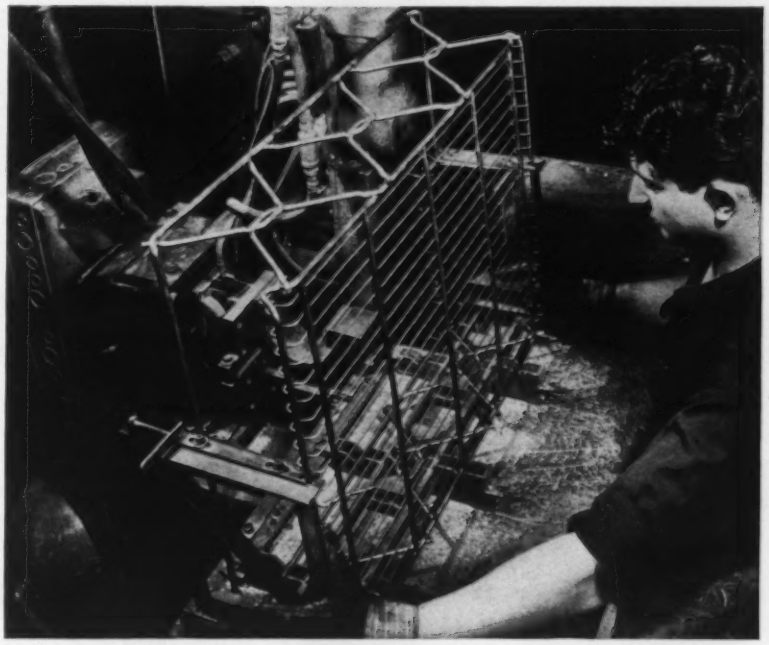
Surface finish of Pittsburgh Steel's wire is vital, too. After assembly, the rack is given a copper-nickel-hard chrome coating to provide a durable, attractive unit which meets strict standards of cleanliness.

Pittsburgh Steel's ability to supply wire with the consistent quality Mid-West Metallic requires is testified to by Purchasing Agent Adams. He says:

"Pittsburgh Steel furnishes us quality wire with uniform properties from shipment to shipment. Otherwise, we're in trouble on our automatic machines. We want wire that is weldable, formable and clean.

"Pittsburgh Steel has been able to give us what we want with consistency and we're extremely satisfied with the way its wire performs for us."

Take a lesson from Mid-West Metallic's experience. The benefits this progressive company gets from using Pittsburgh Steel's wire can be yours, too, whatever your application. Just contact one of the district offices listed at the right.



. . . With 200 welds per rack and a present capacity of more than 25,000 Nestaway racks per month plus component parts of the Nestaway System, Mid-West Metallic experiences very few broken welds in the course of a year. Credit goes to efficient equipment and wire quality. Nestaway rack is shown here in assembly before chrome plating. Mid-West, a subsidiary of Rubbermaid, Inc., looks to Pittsburgh Steel for bright basic wire and plain galvanized wire to make Nestaway racks and more than 300 other products at the new Cleveland, Ohio, plant.

Pittsburgh Steel Company

Grant Building • Pittsburgh 30, Pa.

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Chicago	Dayton	Houston	New York	Tulsa
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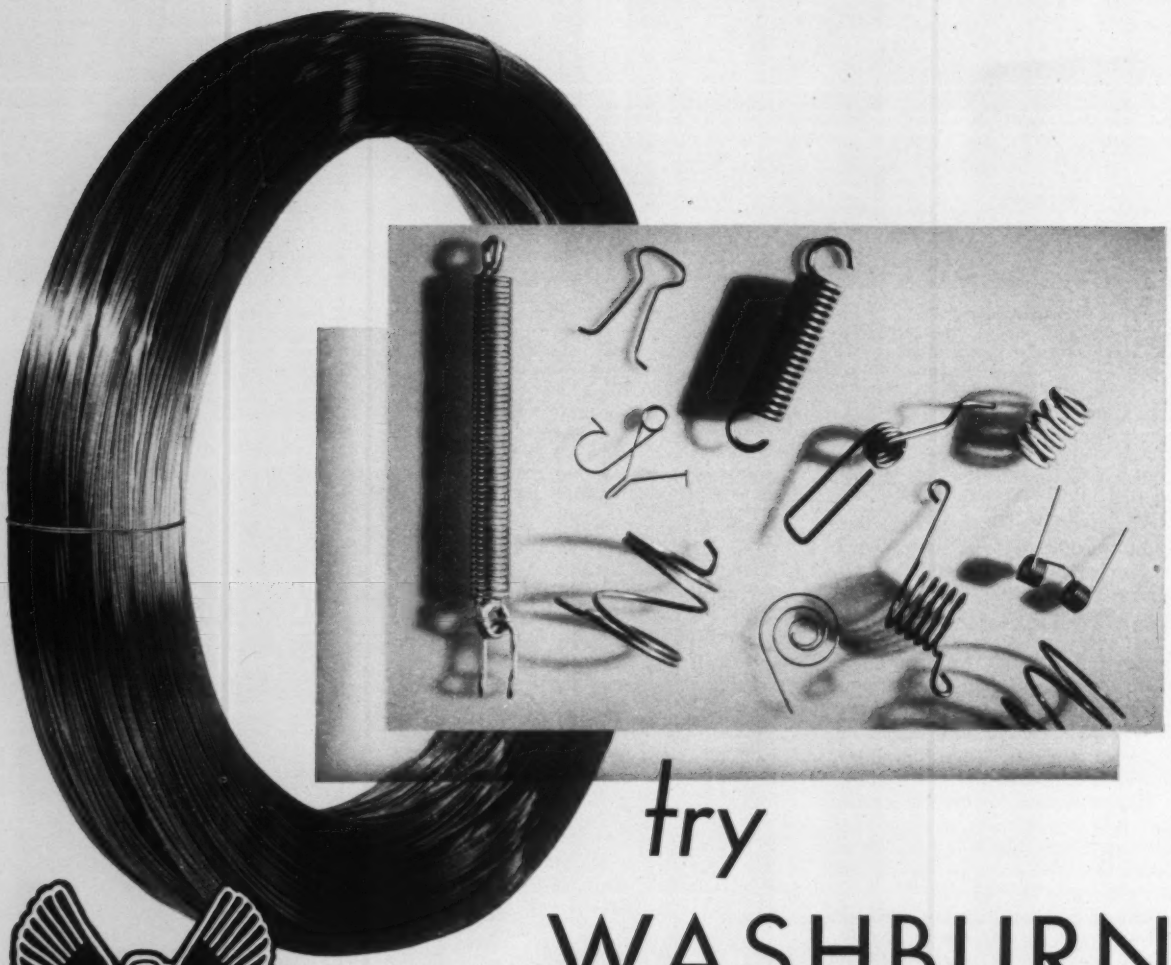
Have YOU a difficult Spring Job?



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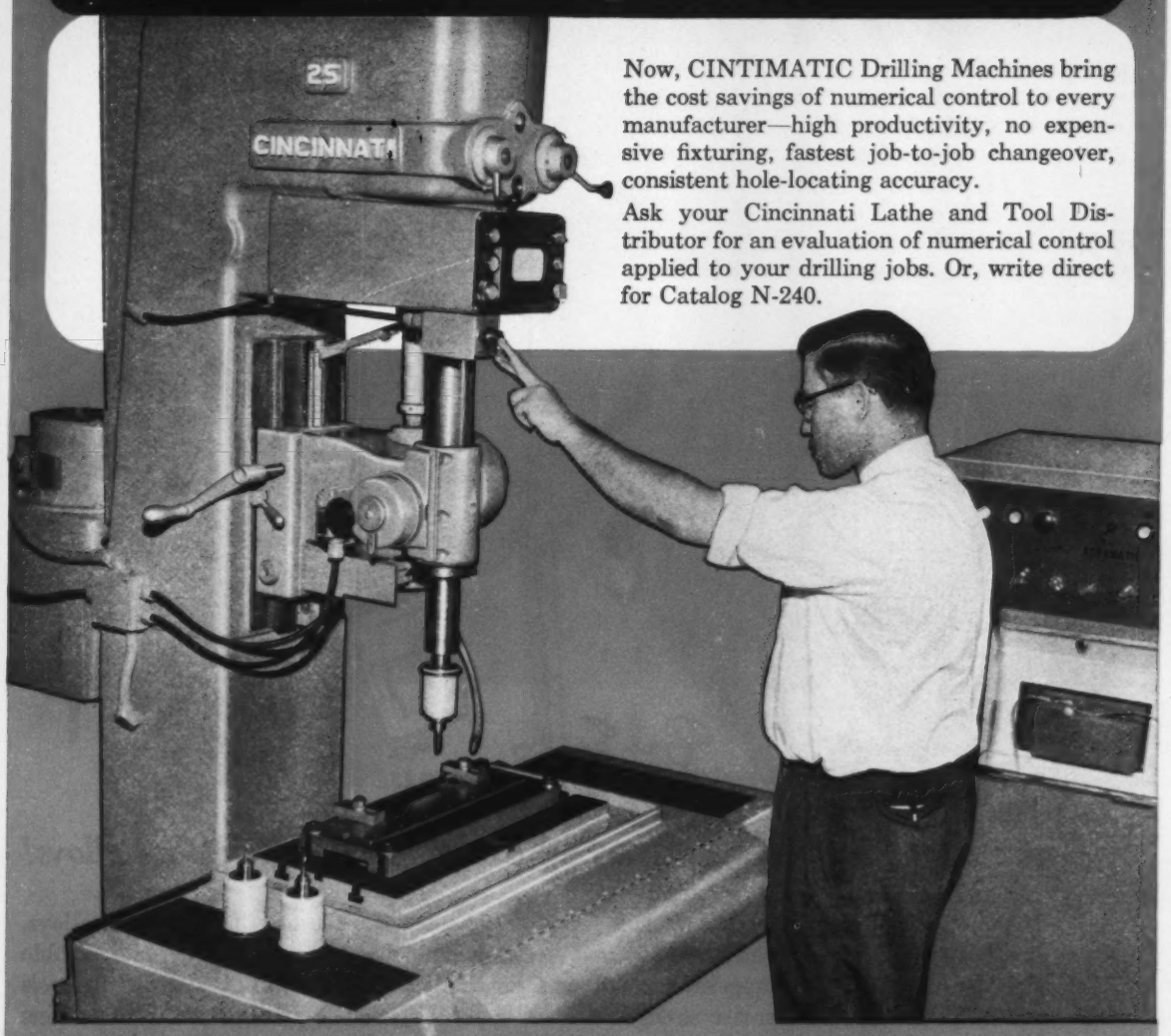
WASHBURN WIRE COMPANY, NEW YORK CITY

CLEAN, UNIFORM BILLETS–STRIP–RECTANGULAR, ROUND, FLAT RODS

TEMPERED AND UNTEMPERED FLAT AND ROUND HIGH CARBON WIRES

Cut Your Drilling Costs With CINTIMATIC NUMERICAL CONTROL... only $13,155!*



Now, CINTIMATIC Drilling Machines bring the cost savings of numerical control to every manufacturer—high productivity, no expensive fixturing, fastest job-to-job changeover, consistent hole-locating accuracy.

Ask your Cincinnati Lathe and Tool Distributor for an evaluation of numerical control applied to your drilling jobs. Or, write direct for Catalog N-240.

* This low, complete price includes 25" numerically controlled drill with complete electrics, power feed, back gear, and Infispeed variable speed drive; 10" x 20" tape controlled, hydraulically operated positioning table; Cincinnati Acramatic control console with tape reader; complete installation and demonstration service.
This machine is readily adaptable for optional tape control of automatic feed cycle; depth selection from six pre-set stops; tool change indicator.

CINCINNATI LATHE AND TOOL CO.

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HYDRASHIFT Lathes / CINCINNATI Drilling Machines / SPIROPOINT Drill Sharpener

CINTIMATIC Numerically Controlled Lathes and Drills

Hot tip for steelmakers – *Use Vancoram Columbium Alloys!*

Different effects are obtained in various types of steels through the use of columbium alloys. For instance, in stainless and heat-resistant steels, columbium serves principally as a carbide stabilizer and prevents intergranular corrosion. Small additions to low-alloy and carbon steels reduce grain size and increase strength. And in Type 430 steels it prevents the rolling defect known as "roping."

VCA produces columbium alloys in two forms: regular Ferrocolumbium and Thermocol® Exothermic Ferrocolumbium. Thermocol cuts production costs through its high recovery rate (generally in excess of 90%) and through reduced furnace time. It permits large additions of alloy with minimum heat loss and without contact between alloy and furnace slag. See your VCA representative or write for descriptive literature. Vanadium Corporation of America, 420 Lexington Avenue, New York 17, New York · Chicago · Cleveland · Detroit · Pittsburgh

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Producers of alloys, metals and chemicals

VANCORAM

We do it better without the Nubians...

According to legend, the master armorers of Damascus tempered their world-famous swords by thrusting them red hot into living Nubian slaves. It was rough on the slaves, but it produced blades of unmatched strength and keenness. Foundrymen at our Midland plant achieve similar effects in cast steel mill rolls with big annealing furnaces like these. We heat the newly-cast rolls to red or yellow heat for a carefully controlled time period, and then cool them, again under precisely controlled conditions, by water or air. We can produce any property or combination of properties the mill operator needs in his rolls. It's more difficult than the old Damascus heat-and-quench cycle, but it's more effective. This care in heat treating and annealing...and at every other step in production...is the reason why *you get more tonnage from the rolls with the Striped Red Wabblers.*

MACKINTOSH-HEMPHILL DIVISION · PITTSBURGH, U.S.A. · BLISS

MACKINTOSH-HEMPHILL • Division of E. W. BLISS COMPANY
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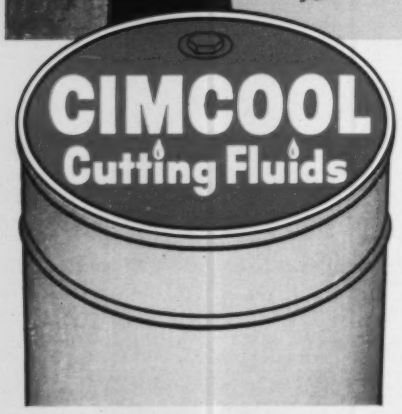
PRODUCTION JUMPED 466%

when CIMCOOL S2, the world's leading chemical cutting fluid, got on the job in Chicago.

(Company name on request.)

PRODUCTION REPORT
SALES REPORT
2.
and they make electrical components. The trouble they were having was in the high production milling of iron relay cores. They had only been able to turn out 120 cores per hour using straight cutting oil.
When we installed Cimcool S2 at a 1:20 dilution, the SFPM went from 120 to 330, and the feed increased from 2" per min. to 12" per min. As a result they increased production of the relay cores from 120 per hour to 680 per hour. That's a 466% jump!
In addition, they eliminated a de-greasing operation after milling. The machine was cleaner. Chips didn't stick to it. With Cimcool there was no smoke, no rust, no dermatitis and no rancidity
Bill Wolfenson
Chicago Office



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Production-proved products of The Cincinnati Milling Machine Co.

CIMCOOL S2 Concentrate — The pink fluid which covers 85% of all metal cutting jobs.
CIMPERIAL° — Newest in the famous, industry-proven line of CIMCOOL° Cutting Fluids.
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CIMCUT Concentrates (AA, NC, SS) — For every job requiring an oil-base cutting fluid.
ALSO — CIMCOOL Tapping Compound — CIMCOOL Bactericide — CIMCOOL Machine Cleaner.

For full information on the complete family of CIMCOOL Cutting Fluids, call your CIMCOOL Distributor. Or contact Cincinnati Milling Products Division, Cincinnati 9, Ohio.

°Trade Marks Reg. U. S. Pat. Off.

the harder you fight
to **beat** production records
the more you need
ultra-smooth running...

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MILL PRODUCTS

MADE IN USA ... *and made better to bring out the* ***BEST*** *in your products*

Scovill Manufacturing Company, Mill Products Division, 99 Mill St., Waterbury 20, Conn.
Phone PLaza 4-1171

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what Scovill is doing to give you metals that can **outrun** modern machines

More uniformly sound metal— Scovill's unique CONTINUOUS BAR CASTING machine handles 30,000 lbs. of molten alloy per hour, but metal from the melting furnaces does not go directly into the casting mold. A 9000-lb. reservoir of the liquid alloy tends to "blend" out any possible variations remaining in the already precisely-controlled melt.
In addition, the controlled and uniform conditions under which the continuous-casting takes place are conducive to exceptional uniformity in cast metal structure. Such uniformity in the cast bar or billet remains with the metal right through to the finished mill products.

More uniformly dimensioned mill products— Scovill's up-to-the-minute mill equipment and procedures, with tight quality control at every step, assure fabricators the close tolerances that high-speed production machinery MUST have . . . uniform thickness of sheet and strip, uniform O. D. of rod and wire, uniform diameter and wall thickness of tube. Close mill tolerances also apply to widths, straightness and surface condition of the metal.

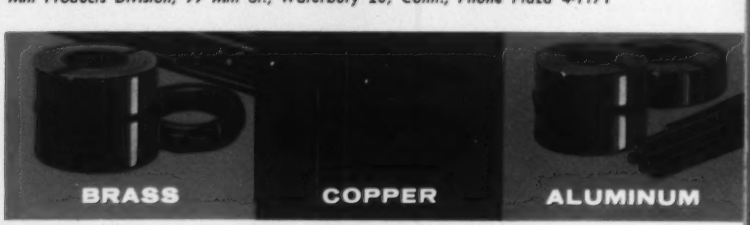
More uniform finishes...color...working qualities— Great strides have been taken in recent years to give fabricators mill products with *inherent* qualities that help reduce additional finishing costs. Scovill mill finishes are superior and uniformly maintained order after order . . . lot after lot . . . an important aid in maintaining your own controlled-quality standards at minimum unit cost.

Longer continuous runs— Recent advances in Continuous Casting and subsequent mill production processes now permit Scovill to offer the industry's longest coils of brass strip and sheet for high-speed press runs. Equivalent extra-long-run coils are also available in TRUSPEC Aluminum sheet. Recent Mill production advances permit longer lengths in other mill products where required.

Technical services— Scovill Metals Research and our extensive experience can be tremendously valuable to fabricators looking for NEW ways to advance competitively. It will pay to make Scovill service a part of your team.

SCOVILL MANUFACTURING COMPANY
Mill Products Division, 99 Mill St., Waterbury 20, Conn., Phone Plaza 4-1171

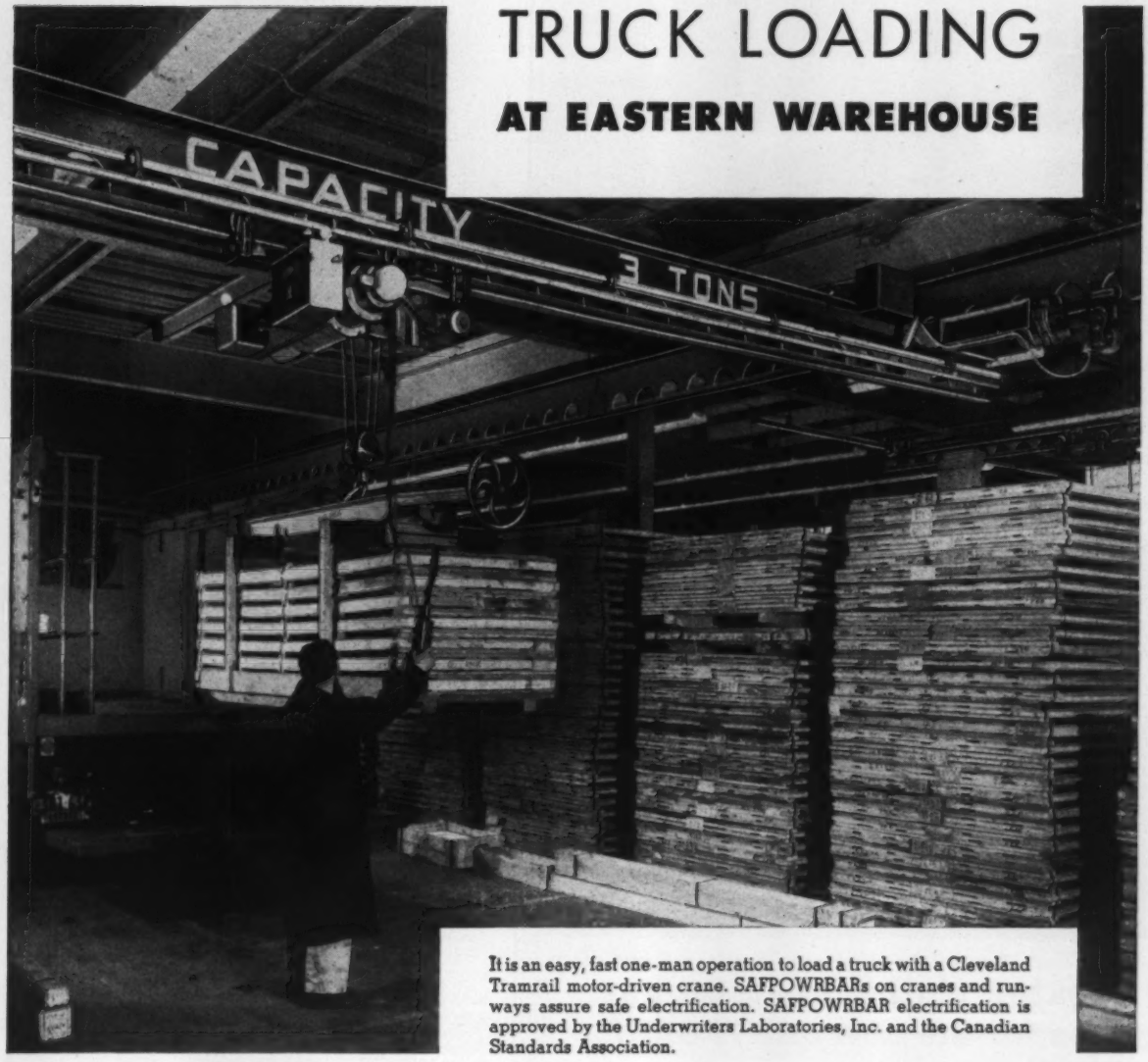
MADE IN USA
. . . and made better to bring out the BEST in your products



MILL PRODUCTS

9SC60

TRAMRAIL CRANES SPEED TRUCK LOADING AT EASTERN WAREHOUSE



It is an easy, fast one-man operation to load a truck with a Cleveland Tramrail motor-driven crane. SAFPOWRBARs on cranes and runways assure safe electrification. SAFPOWRBAR electrification is approved by the Underwriters Laboratories, Inc. and the Canadian Standards Association.

Two 3-ton completely motorized Cleveland Tramrail cranes keep materials on the move in a 400 x 400 foot one-story warehouse of T. E. Conklin Brass & Copper Co., Brooklyn, N. Y.

Two aisleways extending from front to rear of the building allow trucks to pass through. This arrangement permits loading and unloading the trucks close to the storage space and eliminates considerable handling. Another desirable feature is that the Tramrail cranes are high enough to clear over the trucks. This allows the loading of two trucks in each aisleway simultaneously without any interference of one with the other.

The Cleveland Tramrail cranes enable piling the materials higher and thereby increase the effective storage capacity per square foot of floor area.

Conklin stocks 3000 items, which are supplied to users throughout the New York area.

Write for free Engineering and Application Booklet No. 2008. Packed with valuable information.

CLEVELAND TRAMRAIL

Overhead Materials Handling Equipment

CLEVELAND TRAMRAIL DIVISION • THE CLEVELAND CRANE & ENGINEERING CO. • 7846 E. 290 ST. • WICKLIFFE, OHIO

Greater visibility, trimmer lines for the new CHEVROLET, thanks to GAS! This is Libbey-Owens-Ford, where the new panoramic windshields are made for your beautiful new Chevrolet.

The forming of the curved glass is done in a limited temperature range at which glass can be bent without distortion. The production process challenged heat process engineers to design new automatic equipment capable of mass producing these large precision glass pieces.

LOF engineers, working with General Motors, discovered that Gas could produce the proper time-temperature cycle demanded by this process... efficiently, quickly, reliably.

The flat glass is conveyed under radiant Gas burners which bring the glass quickly up to bending temperature and allow the shaping of windshields, with reproducible uniformity, at high production rates.

The production of the Vista Panoramic windshield is another example of the contributions modern Gas equipment is making to American manufacturing. If your operation includes precise process heating, call your Gas company's industrial specialist and see how you can improve production with modern Gas equipment. **AMERICAN GAS ASSOCIATION**

FOR PROCESS HEATING GAS IS GOOD BUSINESS

"The FT20 has more power, better stability and is much easier to maneuver,"

says Bill Spellings, lift truck operator at Chromcraft Corporation, St. Louis.

It's easy to understand why any operator would like these advantages. But let's see how they apply at Chromcraft Corporation specifically:

"More power at the drive wheels"

Production at Chromcraft is on two levels, and lift trucks must negotiate a ramp between them. Here the Allis-Chalmers FT20 is outstanding. It can come to a full stop going up the grade and start again easily with a capacity load. (Actually, that grade could be increased to 40 percent and the FT20 would still go up because it has the most power in the 2,000-lb truck class.)

"Better stability"

To reach some areas in the plant, it is necessary to carry the load high in order to clear machines and material. This stresses the importance of stability . . . again makes the FT20 first choice for the job, because of its low center of gravity and good weight distribution.

"Much easier to maneuver"

Always important, but especially so at Chromcraft. The loading dock is narrow and busy, and trucks must maneuver inside box cars. The FT20, with tight turning radius and easy steering ("I could turn it with one finger"), can pick its way in, around, and through areas where even smaller, less powerful machines cannot follow.

No engine overhaul in more than 18,000 hours

Chromcraft Corporation is one of the world's largest manufacturers of commercial and dinette furniture. Included in its fleet of lift trucks are two 2,000-lb Allis-Chalmers FT20's and three FT40's. Not one of the Allis-Chalmers machines has required an engine overhaul, although the oldest has logged more than 18,000 hours in 4½ years.

These Allis-Chalmers advantages can make a dollar-saving difference in your plant. Why not look into it? See your Allis-Chalmers dealer, or write for full information. Allis-Chalmers, Milwaukee 1, Wisconsin.

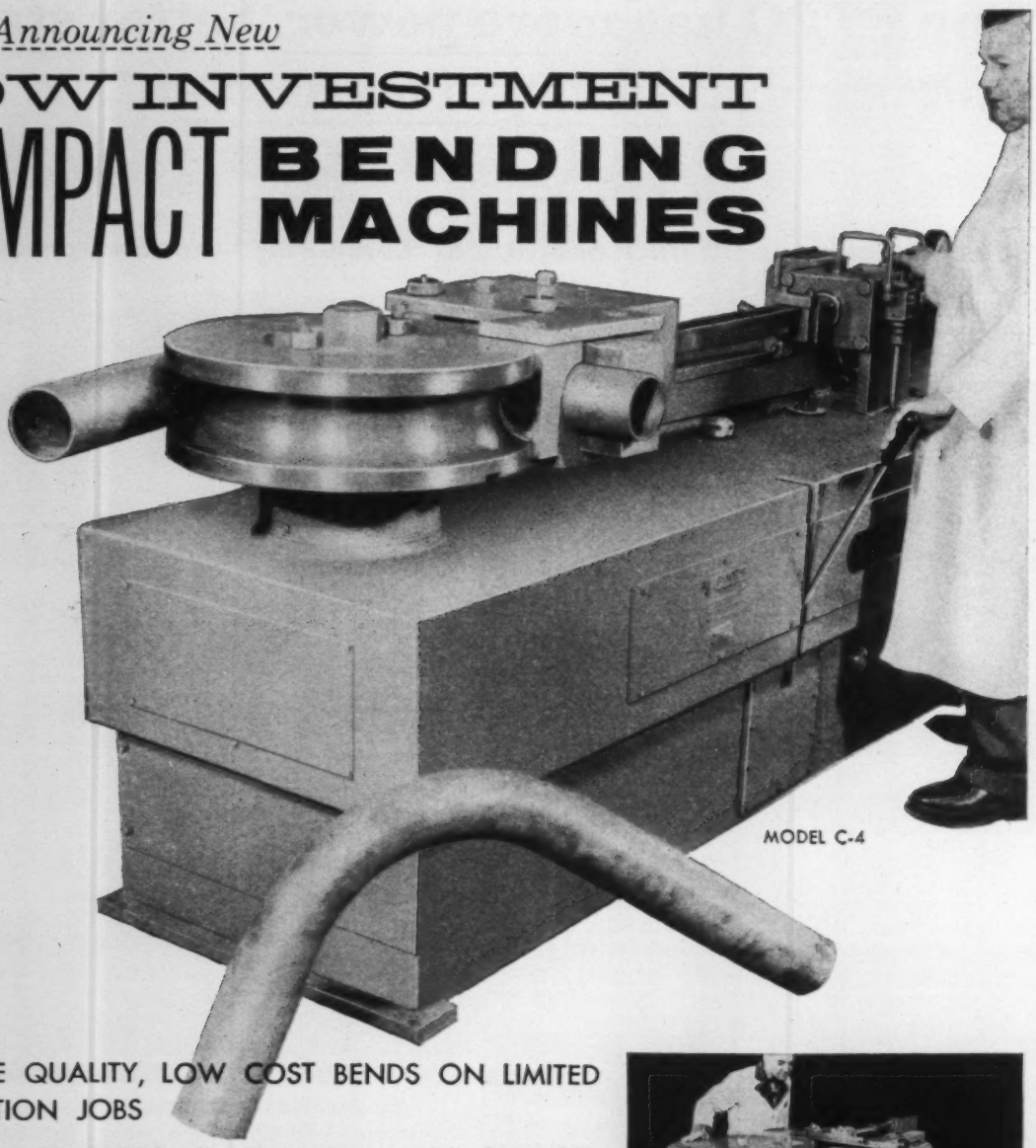
BH-147

ALLIS-CHALMERS

POWER **FOR A GROWING WORLD**

Announcing New

LOW INVESTMENT COMPACT BENDING MACHINES



MODEL C-4

PRODUCE QUALITY, LOW COST BENDS ON LIMITED PRODUCTION JOBS

The new Pines COMPACT Bending Machines are especially designed for low production jobs, one-of-a-kind or experimental parts, maintenance or similar work where the high output of other Pines machines is not necessary. Representing a low initial investment, COMPACT machines are easily and inexpensively tooled to bend structural shapes, solid stock, and rolled or extruded sections as well as pipe and tubing.

Light in weight for practical portability and simplified in design for maximum ease of operation and set up, this complete line of machines incorporates rugged construction and hydraulic operation to assure good quality bends with close tolerances at low cost. Find out how COMPACT Machines offer a practical answer to quality limited production bending.

MODEL C-4
Capacity up to 4" I.P.S. standard pipe... Floor space 3'x11'... weight 6300 lbs.

MODEL C-2
Capacity to 2" I.P.S. standard pipe... Floor space 2'x7'... weight 2400 lbs.

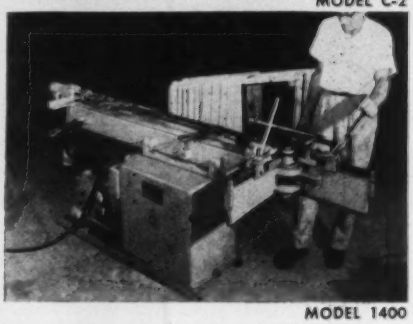
MODEL 1400
Capacity to ½" I.P.S. standard pipe... Floor space 4'x8'... weight 1400 lbs.

WRITE TODAY FOR COMPLETE INFORMATION

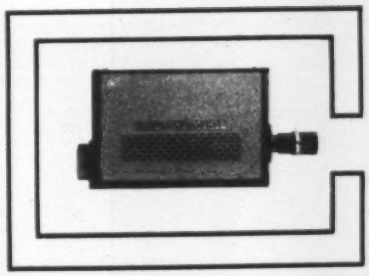
PINES ENGINEERING CO., INC.

Specialists in Tube Fabricating Machinery — **665 WALNUT • AURORA, ILLINOIS**

MODEL C-2



MODEL 1400



SEE IT HOT... AND SAVE

WITH TELEVISION BY FAIRBANKS MORSE

How much can you save in fuel and time by seeing when fired materials are ready to go... the molten glass or metal or clinker, the burning ceramic, the glowing steel strip?

How much do you lose each year through flaws in such hot materials as these... that wouldn't be lost if the flaws were seen?

You get unique continuous visual control of these hot spots with Fairbanks Morse Closed Circuit TV. In comfort, too. Water-cooled Fairbanks Morse TV cameras can check the combustion zone, molten flow and clinker grates of a cement kiln, look into a blast furnace, keep close watch on glowing metal in rolling mill or foundry. In fact, all high temperature combustion areas may be monitored for easy watching by the operator and shift supervisor (who can't be water cooled). Further, your plant manager may watch the entire operation from his office 2000 feet away. Let your imagination be your guide to savings by seeing... with Fairbanks Morse TV. Full information is yours for the asking from: Electronics Division, 506 Oakwood Avenue, West Hartford, Connecticut or your nearest District Office listed below.

FAIRBANKS MORSE

ELECTRONICS DIVISION

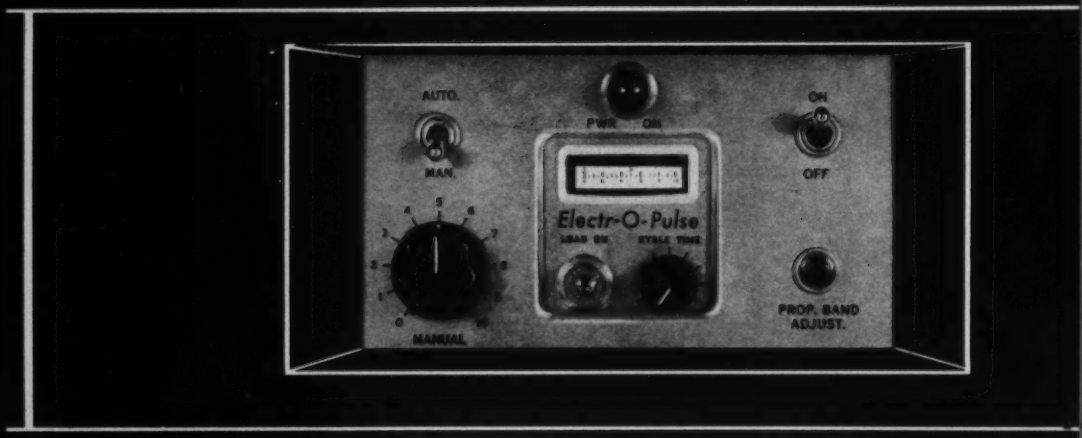
A MAJOR INDUSTRIAL COMPONENT OF

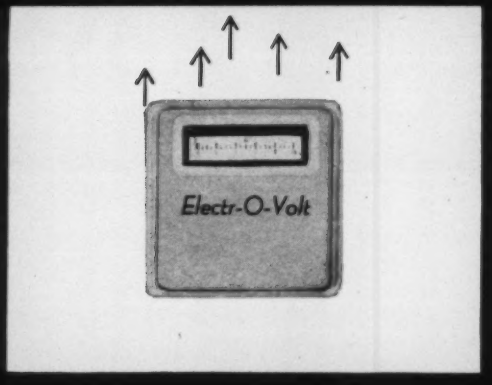
FAIRBANKS WHITNEY

FAIRBANKS MORSE, ELECTRONICS DIVISION: CLOSED CIRCUIT TELEVISION, OSCILLOSCOPES, RADIATION MONITORS, AUTOMATIC WEIGHING AND PROPORTIONING EQUIPMENT. DISTRICT OFFICES: 760 LEE STREET, S. W., ATLANTA, GEORGIA; 1330 S. STATE STREET, CHICAGO, ILLINOIS; 1715 N. MARKET STREET, DALLAS, TEXAS; 19-01 ROUTE 208, FAIRLAWN, NEW JERSEY; 220 EAST 9th STREET, ST. PAUL, MINNESOTA; 639 3rd STREET, SAN FRANCISCO, CALIFORNIA. SERVICE IN OTHER PRINCIPAL CITIES.

H
HONEYWELL

Electr-O-Line


AUTO.
MAN.
PWR ON
ON
OFF
Electr-O-Pulse
MANUAL
PROP. BAND ADJUST.


Electr-O-Volt

Three ways to get peak performance from your furnaces!

1. Electr-O-Line Control Unit for position-proportioning control with reset and rate action
2. Electr-O-Pulse Control Unit for time proportioning control with reset and rate action
3. Electr-O-Volt Control Unit for current-proportioning control with reset and rate action

These new Honeywell three-mode control units can actually improve the performance of your furnaces by providing the exact temperature that's needed. They include features that cannot be matched:

Smooth three-mode control with extra-wide band adjustments. You can adjust the proportional band up to 500%; reset action from 0 to 100 repeats per minute; and rate time from 0 to 10 minutes. Proportional band can be readjusted without upsetting the process. Special rate circuit minimizes overshoot in batch processes and during startup. Auto-man switching on all units is bumpless.

Modular construction with interchangeable control output sections. Modular plug-in construction is used throughout. Amplifier and power supply sections are the same for all three units. Only the control output section changes. Interchangeability of this section simplifies stocking and servicing.

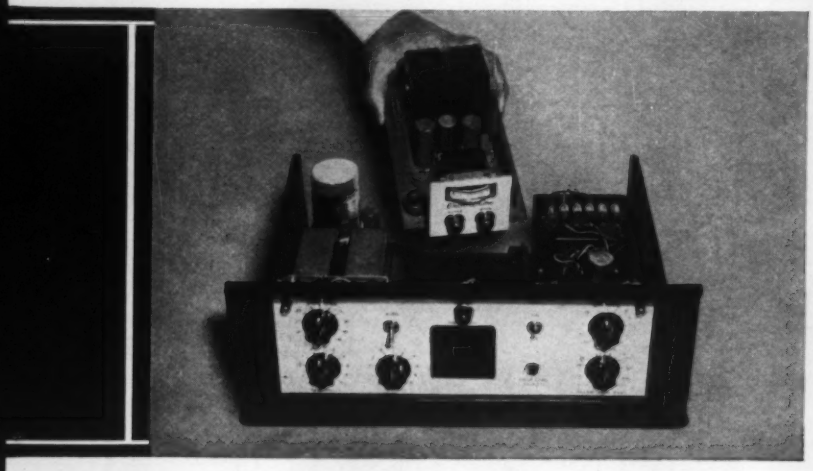
ElectroniK Strip Chart, Circular Chart, and Circular Scale Controllers are used with Electr-O-Line, Electr-O-Pulse, and Electr-O-Volt units. They are integrally mounted, simplifying panel cutout and reducing wiring costs.

For more complete details on these and other types of furnace controls, contact your nearby Honeywell field engineer. He's as near as your phone. MINNEAPOLIS-HONEYWELL, Wayne and Windrim Avenues, Philadelphia 44, Pa.

Honeywell

First in Control

SINCE 1885



HONEYWELL INTERNATIONAL Sales and Service offices in all principal cities of the world. Manufacturing in United States, United Kingdom, Canada, Netherlands, Germany, France, Japan.

"We found that many of our employees have been using the Payroll Savings Plan for twenty years!"

"Frankly, I was surprised to find out that the Payroll Savings Plan has been in operation for two decades. Even more surprising was the fact that so many of our people have been using the Plan to buy U. S. Savings Bonds every single month since the Plan was first put in. Some of our veterans told me they have used these savings to help buy homes, put youngsters through college, and to build up their reserve for retirement. Because it benefits the country and the community as well as themselves, we feel more of our people should take advantage of the Payroll Savings Plan. That's why we conduct a new canvass each year to remind them of its benefits. In addition, we call it to the attention of all new employees at the time they come to work."

Perhaps your own company staff has been increased substantially since your last Payroll Savings Campaign. If you will contact your State Savings Bonds Director, he'll be glad to set up a thorough canvass of your company family, and see that every employee gets a friendly explanation of the Plan, and how it makes regular saving so easy it is actually automatic.

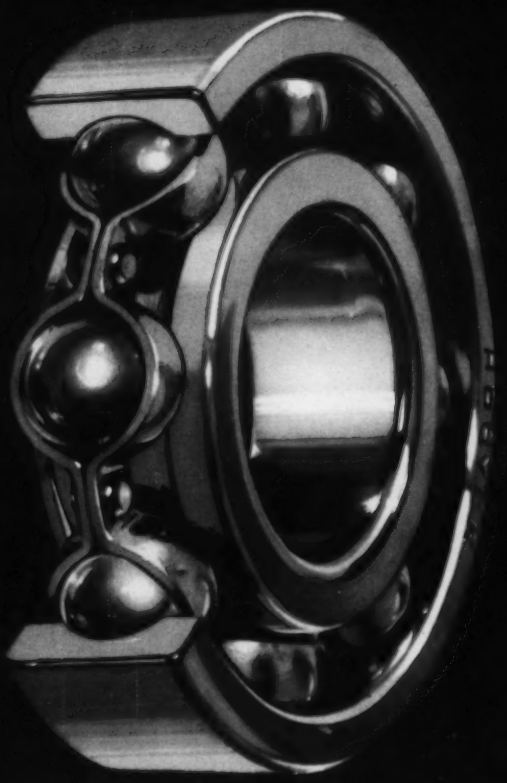
ALL U.S. SAVINGS BONDS—OLD OR NEW—EARN ½% MORE THAN BEFORE

STEEL
The Metalworking Weekly

THE U. S. GOVERNMENT DOES NOT PAY FOR THIS ADVERTISEMENT. THE TREASURY DEPARTMENT THANKS, FOR THEIR PATRIOTISM, THE ADVERTISING COUNCIL AND THE DONOR ABOVE.

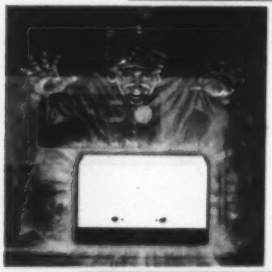
hoover quality

. . . CONTROLLED FROM START TO FINISH



High quality chrome alloy steel wire is produced by the Cuyahoga Steel and Wire Division of Hoover Ball and Bearing Company.

Micro-Velvet balls are produced in the Hoover Ball Division plants in Middletown, Ohio, and Erwin, Tennessee.



Hoover is actively engaged in the development of an expanded line of non-destructive electronic inspection equipment.

Hoover Quality bearings are the final result of the combined know-how of highly specialized, yet integrated Hoover divisions.

Hoover Quality, widely recognized by bearing users, is the result of complete control of every step in the manufacture of bearings.

Specialized knowledge gained through the operation of its own wire drawing mill aids Hoover in setting and controlling the quality standards of wire from which balls are made.

As America's leading producer of balls, Hoover has the experience and equipment it takes to make balls of exceptional quality. *Micro-Velvet* balls used in Hoover bearings are accurate within millionths of an inch!

And Hoover utilizes exclusive processes that assure product superiority. *Hoover Honed* raceways are super smooth, superbly finished. Testing and inspection at various stages of manufacturing are accomplished with specially designed equipment. Even non-destructive electronic inspection is employed.

Hoover Quality is the result of complete control . . . from start to finish.

hoover

BALL AND BEARING COMPANY

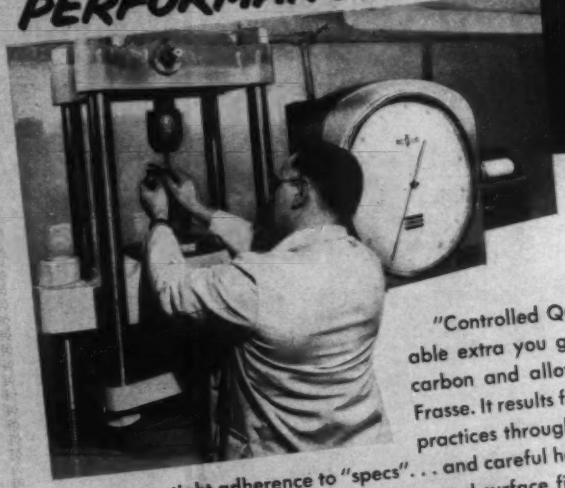
5400 South State Road, Ann Arbor, Michigan

Zone Sales Offices and Warehouses	8581 South Chicago Ave., Chicago 17, Illinois 290 Lodi Street, Hackensack, New Jersey 2020 South Figueroa, Los Angeles 7, California

Micro-Velvet and *Hoover Honed* are Hoover Trademarks.

PREDICT PERFORMANCE with ...

FRASSE "CONTROLLED QUALITY" STEEL BARS



"Controlled Quality" is the valuable extra you get in every bar of carbon and alloy steel shipped by Frasse. It results from rigid inspection practices through every step of production . . . tight adherence to "specs" . . . and careful handling, storing and shipping methods to protect straightness and surface finish.

The advantages of Frasse "Controlled Quality" are yours—in uniform results from bar to bar . . . shipment after shipment. It assures predictable performance from the steel you use . . . before you use it. You get exactly what you pay for, every time.

Since 1816—when Frasse first began serving steel users, its reputation for product reliability has been unsurpassed. That's why Frasse is a leading source for carbon bars and shafting—as well as commercial and aircraft quality alloy steels.

Frasse stocks an unusually complete range of sizes and grades—quick deliveries are routine. If you insist on top quality—want it fast . . . make it a point to call Frasse. Thousands of leading firms do . . . to their complete satisfaction.

Call FRASSE 1st for

Carbon and Alloy Steels

Frasse Stocks Include:

C1018	C1141	E4130
C1045	C1212	4130 H.T.
B1112	C1213	4140
B1113	Ledloy	4142
B1113X	4615	4142 H.T.
C1117	8620	E4340
C1137	E9310	E8740

STEEL SERVICE CENTER INSTITUTE

Peter A. Frasse & Co., Inc.

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BLAW-KNOX

Universal Slabbing Mills

Blaw-Knox designs and builds slabbing-blooming mills in a complete range of sizes in universal and high lift types. Other Blaw-Knox equipment for the metals industry includes complete rolling mill installations and auxiliary equipment for ferrous and nonferrous metals, sheet and strip processing equipment, electrolytic tinning, annealing, and galvanizing lines, seamless pipe and tube mills, draw benches, and cold draw equipment, Blaw-Knox Medart cold finishing equipment, iron, alloy iron and steel rolls, carbon and alloy steel castings, fabricated steel plate or cast-weld design weldments, steel plant equipment, and heat and corrosion resisting alloy castings. Blaw-Knox Company, Foundry and Mill Machinery Division, Blaw-Knox Building, 300 Sixth Avenue, Pittsburgh 22, Pennsylvania.

46 x 90 inch Universal Slabbing Mill.

strength

the LION and the MOUSE

A mouse wandered into a lion's cave by mistake. The lion placed his huge paw upon the mouse, and was about to eat him when the victim squealed: // "Forgive me, king of beasts, I did not know where I was! If you let me go just this once, I may be able to do you a good turn some day." The lion, tickled by the idea of a little mouse helping the mighty king of beasts, freed his frightened friend. // Later, the lion was entrapped in a rope net left by hunters. His roars filled the forest. The mouse recognized his voice and ran to help. The mouse set to work gnawing the ropes, and in a short time the lion was free.

moral: Small size may prove great strength.

Sometimes, small size can be a big advantage. High-speed assembly machines, for example, need small cylinders in order to save space and maintenance costs. That's why we have designed a new line of strong, 1"-bore cylinders for air service to 150 psi.

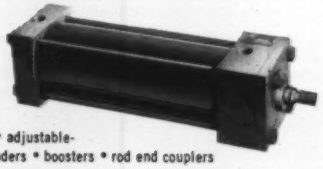
A Teflon rod seal and wiper combination in this cylinder requires no lubrication, resists all corrosives. Low co-efficient of expansion in Teflon piston seals increases cylinder efficiency and reliability. Barrel seals are radially supported by shoulders on barrel ends to insure leakproof seal compression.

The address of your nearest Hydro-Line representative is in *Sweet's Product Design File.* Ask him to show you the choice of mountings for Hydro-Line 1"-bore cylinders from ½" to 5" stroke, ready for immediate delivery. Or, phone TRemont 7-5758 to contact the factory direct. Custom strokes available upon request.

HYDRO-LINE

HYDRO-LINE CYLINDERS

5604 PIKE ROAD, ROCKFORD, ILLINOIS, manufacturers of:
high- and low-pressure hydraulic cylinders • heavy-duty air cylinders • adjustable-stroke cylinders • dispensing cylinders • intensifiers • single-acting cylinders • boosters • rod end couplers



A fresh approach to metal cleaning

Metal parts and assemblies which have undergone machining, grinding, heat treating, forging or press drawing operations usually have to be cleaned prior to the next processing step or final packaging.

A cleaning compound is selected according to the type of soil, its stubbornness and whether the surface has to be chemically clean—as required if plating or enameling are to follow.

Since the development of surface active agents it has been found unnecessary in intra-operation cleaning to use a harsh alkali. Today's metal cleaning compounds seldom contain free caustic, yet they are far more effective than the earlier materials. By combining detergents with mild alkalies there are definite advantages of easier rinsing, better soil dispersion and emulsification, plus minimum resoiling from a used bath.

Excessive heat unnecessary

Temperatures can be lower, too, hence easier on the operators. The same modern cleaner which will remove light soil at room temperature will be more effective at 120°-140°, but it need not be raised to the boiling point, with resultant fumes, steaming and discomfort.

The detergents used in these modern cleaning formulations for use in power washers are non-foaming, therefore do not interfere with maximum spray impinging force which helps dislodge adhering soil.

Rust protection built in

Another modern trend in cleaning compounds is to add a water-soluble rust preventive, to protect against early rusting by leaving a very slight film on the metal—one which does not interfere with subsequent operations. Of course, this is not possible when cleaning before plating or porcelain enameling where a chemically clean surface is required.

Determining the concentration of a cleaning bath and its rate of exhaustion is one of the puzzlers for many a metalworking plant. To be accurate, a chemical titration is more dependable than short-cut "gadgets" sometimes offered. The Houghton technical staff man uses this kit for exact measurement of the strength of a solution. Description or demonstration is available to our customers upon request.

One more improvement in today's cleaners is the property of water softening. These newer products contain sequestering or chelating agents which combine with hard water constituents, holding them in solution and preventing precipitation on the work or in the rinse tank.

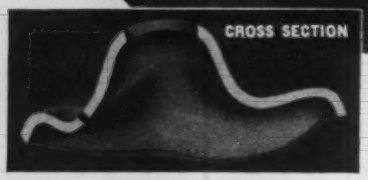
This ability of today's metal cleaners to lower surface tension, to protect against early rusting and to soften hard water has resulted in industry's taking a new look at their cleaning practices. Fewer varieties are required because a single cleaner will do a far wider range of work than could the old style free-caustic varieties.

Houghton's new approach to cleaning is typified by our Cerfa-Kleen line of soak tank and power washer compounds—both for cold and hot solutions. If you need a plater's cleaner, or one for removal of inorganic soil, or an acid type, we have those too. **Write E. F. Houghton & Co., 303 W. Lehigh Ave., Philadelphia 33, Pa.**

Houghton

INDUSTRY'S PARTNER IN PRODUCTION

DSC *Accutronic*® STRIP Scores JOB-PERFORMANCE Bull's Eye on Engine Valve Rocker Arm Stamping



99.847%

FACTS ABOUT THE JOB

The Part: Valve Rocker Arm—Standard in all "sixes" and "eights" used in the leading line of a big 3 car maker.

The Performance Period—1958 through 1960.

The Material—AISI 1010 Cold Rolled Steel Strip .1196″ ±.003″ x coil, drawing quality, regular satin finish (as supplied by DSC Strip Division).

Functional Requirements—Level gauge and even temper within specified tolerances to permit high speed, non-stop production; uniform chemical composition and micro structure to permit development of necessary physical properties through heat treatment.

The Operations—Blank (multiple); Multi-station progressive forming and coining dies: re-strike, pierce, heat treat.

Accutronic—A Registered Trademark descriptive of DSC Cold Rolled Sheet and Strip products.

A "NO-NONSENSE" JOB

This is a high-speed, non-stop, big run, automated stamping job. Drawn, formed, coined, re-struck and pierced from the blank to final dimensions without trim . . . then heat-treated. Production hinges upon the dimensional and metallurgical consistency of the material. This is a "No-Nonsense" kind of job.

MAN-SIZE GAUGE, TOO

It's a fact . . . most strip makers shy away from gauges as heavy as .1196″ . . . even on less complicated jobs. To DSC Stripmakers, thickness up to .187″ (sometimes heavier) is all in the day's work. At the opposite extreme, we roll down to about .010″.

NO. 1 INGREDIENT OF HIGH JOB-PERFORMANCE

Jobs like this valve rocker arm challenge the tooling and manufacturing ingenuity of the stamper, and the steelmaking skills of the supplier. The No. 1 ingredient of high job-performance, as in this case, is the way buyer and supplier understand each other's problems and work together to solve them.

DSC STRIP SERVICE MIGHT HELP YOU, TOO

Have you a stamping or roll-forming job that's made from a blank under 24″ wide . . . one that might benefit through better production and/or lower over-all cost from level gauge, even temper, job-fitted finish? Let's put our heads together. For quick action, call your nearest DSC customer "Rep" or write: Detroit Steel Corporation, Box 7508, Detroit 9, Michigan.

Customer Satisfaction—Our No. 1 Job

Performance Proved Steel The Bargain Wonder Metal

DETROIT STEEL

Flat Rolled and Wire Products

Customer "REP" Offices in Principal Cities

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Fixing vs. Fighting

A senior friend dropped into the office as we were reading about the electrical equipment industry's price fixing case.

"Industry will rue this case for a long time. It'll take years to restore the image tarnished by those revelations of pricing hanky panky.

"I've always been a pretty stanch believer in the free enterprise system, and I just can't condone price rigging. I don't like it even when it's done by the labor unions or the government.

"But you know, there's something going on in this economy of ours that's just as bad as price fixing—maybe even worse. That's price fighting. It's like the common cold—with us all the time, but sometimes, like now, it becomes epidemic. People ignore their costs—if they really know what they are—and sell at any old price to get an order.

"They are selling on price alone. They should sell more on quality and service and engineering.

"So what happens? Their profits go out the window. Pretty soon, they have no money to buy new equipment. They have no money to research and develop new products. They can't afford to provide good service. Their product tends to become shoddy. They can't grow.

"Now we are going to be adding 1,350,000 new people to the labor force each year during the sixties. Who's going to provide jobs for all those people?

"If you ask me, irresponsible price fighting is worse than price fixing.

"Son, you ought to write a piece about it."

In two minutes, our senior friend had pretty well summed up two affronts to our economy—price fixing and price fighting. One is illegal, and the other is just plain foolish. Both are equally damnable.

Both could be eliminated by a simple pricing creed: Know your true costs. Price your product firmly to return a profit that is fair but not exorbitant. Then aggressively seek to reduce costs by all legitimate means to permit an orderly reduction in prices, while maintaining a reasonable profit.

In simplicity lies strength.

Walter J. Campbell

EDITOR

Now you see steel

taking up valuable space in your plant

If you use steel in small or moderate lots, why tie up valuable floor space with a steel inventory you might not really need?

Steel

for Strength
. . . Economy
. . . Versatility

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

BETHLEHEM STEEL

Now you don't

thanks to your local Steel Service Center

STEEL SERVICE CENTER INSTITUTE

Why not save space, and the cost of that space by using the large and varied steel inventory* of your local Steel Service Center?

BETHLEHEM STEEL

*Your local Steel Service Center carries Bethlehem shapes, plates, bars, sheets, tool steels, alloy steels, and other steel products. They'll deliver these top-quality products fast—tailored to your requirements, ready for production.

Take a Ledloy steel—Inland's famous family of free machining steels—and give it all you've got! Go on—double and triple your normal speeds. Up to 325 sfm is common with Ledloy and believe us, far greater speeds are perfectly possible—up to 450 sfm with high speed tools—600 sfm with carbide tooling. ■ Step up the feed, too. Drill at 40 inches per minute at 750 rpm if you have the equipment for it. Matter of fact, you can't tell how much faster—better—you can do with a Ledloy steel 'til you've pushed it to the limit. ■ One thing to remember—you won't get these amazing results with just any leaded steel. To get the most out of your equipment, use Inland Ledloy—the original leaded steel. ■ That's right—Inland made leaded steels long before anyone else—has been developing the unique properties of Ledloy steels for more than 20 years—can recommend exactly the right type for your shop and your product. So use Ledloy steels—hit them with all you have...

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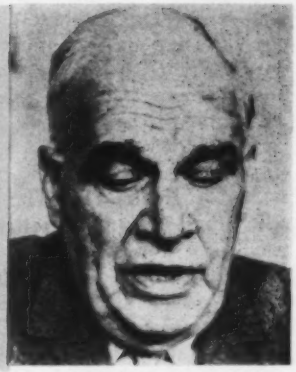
While Commerce Secretary Hodges admitted the auto industry would get a federal lecture on the evils of the wage-price spiral . . .



Labor Secretary Goldberg emphasized: "There is no intent to take over established collective bargaining machinery"

Goldberg's Council: Big Test Ahead?

THE BIG TEST for President Kennedy's new advisory committee on labor - management policy (proposed by Labor Secretary Arthur Goldberg) could be provided by the upcoming negotiations.

Plans for the committee had barely been announced when Commerce Secretary Luther Hodges said both sides in the auto industry could expect to get a lecture on the evils of the wage-price spiral.

• **Its Role in Bargaining**—Administration officials have said the committee might step into major labor-management disputes where settlements could affect prices of basic products. In a message to Congress, the President declared: "We cannot afford unsound wage policies and price movements which push up costs," or weaken industry's international competitive position.

Left unsaid is the matter of pressures which the President can bring on management or labor (via the committee) to solve bargaining problems.

There is one indication: Commerce Secretary Hodges announced that the automotive industry's negotiations would receive scrutiny by the committee.

• **UAW Warms Up for Battle**—Job security will be the No. 1 issue when the automotive bargaining talks open in July. Walter Reuther's United Auto Workers' union has lost some 200,000 members since 1957.

The Big Three automakers are as concerned about the employee job security and dislocation problem as the UAW. But they are against any government interference, advisory or otherwise. "A third party only confuses the picture," commented one executive. The automakers express hope that such problems can be worked out with the union alone.

Like Secretary Goldberg, Mr. Reuther has been a long time advocate of the "third party" negotiator.

The UAW's leader says: "We welcome Mr. Kennedy's announcement . . . I hope . . . the committee

. . . can find ways for our free society to achieve and maintain full employment and avoid recurring recessions. The future of our society, in large measure, hinges upon our ability to harness the abundance of automation and relate this abundance to the needs of the whole community."

• **AMC's Feelings** — The union won't find any support for the government's committee from American Motors Corp. George Romney, AMC's president, called in a panel of clergymen to advise on 1958 negotiations, but he's against summit meetings because members on each side tend to take positions designed for public relations effects. AMC officials do feel, however, that the committee approach on a company basis has possibilities. AMC will definitely bargain by itself instead of "in parallel" with the Big Three. The automaker is now strong enough to make demands of its own.

• **The Shapeup**—Aims of the administration's committee will include advising on actions to promote free and responsible collective bargaining, industrial peace, sound wage and price policies, a higher standard of living, increased productivity, and betterment of America's competitive position in world markets. It will also consider national manpower needs plus benefits and problems created by automation and other technological advances.

The committee will have 21 members—seven from labor, seven from management, five from the public, and two Cabinet members, Mr. Goldberg and Mr. Hodges. The first chairman will be Mr. Goldberg, with the post alternating between him and Mr. Hodges annually.

Secretary Goldberg takes pains to reassure management that the committee will not "foster a compulsory system of wage and price policy and will not hand out resolutions to be rubber-stamped by management and labor."

• **New Portent** — White House sources say the group could extend its interest in price stability to specific studies of industrial pricing policies. They point out, however, that the advisers will be "much more concerned with action labor and management can take," rather than what the government can try to accomplish.

The President says: "Price increases for many products and services have occurred because . . . industries have lagged in the march of productivity and technological advance."

Though a precise agenda has not been established, administration sources say the first major effort of the committee will be in the direction of making U. S. goods more competitive in foreign markets. President Kennedy ties in that goal with tax incentives to expand investment in plant and equipment in the U. S. The committee will also seek ways to make increased automation of industry compatible with labor's interests. Retraining programs for displaced workers and plant relocation in blighted areas are being considered as possible solutions.

'61 Labor Talks Spotlight UAW

THE SPOTLIGHT'S focused on the auto bargaining sessions this year, even though nearly 120 contracts (each covering 5000 or more workers) will be negotiated in all of industry.

Negotiations in Detroit won't get underway until July (contracts at Ford Motor Co., General Motors Corp., and Chrysler Corp. expire Aug. 31). And the United Auto Workers won't finalize demands for another two months. Yet the build-up of bargaining pressures is apparent.

Faced with below seasonal sales and high inventories, carmakers are laying off workers and trimming February production schedules. The situation increases worker concern for job security.

• **Shorter Workweek** — Leonard Woodcock, UAW vice president, reports that workers in GM's 130 locals across the country feel the most important thing the union must do is save their jobs. "There's strong feeling that any economic gains should be toward shortening the workweek with no cut in pay, or some other means of creating work," Mr. Woodcock declares.

The UAW has also announced a series of hearings designed to get ideas from locals on how to deal with production standard problems. Emil Mazey, secretary-treasurer, heads the project. The first hearing is set for Feb. 20 in Los Angeles. The last will be held in St. Louis on Apr. 4.

Automakers are in no mood to grant a big wage package. They charge that direct labor costs have climbed 10 per cent since 1958, while car prices have remained relatively stable. One executive commented privately that he thought 7 cents per hour would be a fair increase for the total package—including fringes, direct wage boosts.

Other major metalworking contracts up for bargaining this year are listed at right. They and the auto talks will set the guideposts for bargaining in hundreds of medium and small sized firms.

• **Deferred Increases**—A major influence will be the deferred wage increases (coming due) that were won in settlements made in 1960 or earlier.

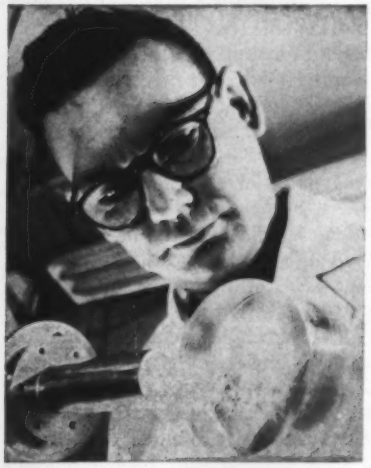
The Bureau of Labor Statistics says at least 2.9 million workers covered in major contracts (1000 workers or more) will get deferred wage increases this year. Generally, the increases will average 8 cents an hour—steelworkers in the major firms will get 7 to 10 cents per hour in October.

You'll see increased pressure by more and more firms to eliminate the cost-of-living clause, which suffered a major setback in 1960 bargaining. Walter Reuther, UAW

president, has already served notice that he intends to keep the provision —along with the annual improvement factor in the auto contracts. The cost-of-living clause has cost automakers 51 cents an hour since 1948, and the improvement factor provision has added another 61 cents in the same period. Look for the auto firms to sit down at the bargaining table with statistics showing the impact of foreign competition as a major argument against the annual improvement factor.

• **Business Weather**—The other big factor in this year's bargaining is the business climate. Management negotiators should have this factor pretty much on their side over the next two or three months. If the business curve turns up (most metalworkers feel it will) in the second quarter, the unions will get firmer in their demands.

Officials at the Associated Industries of Cleveland feel that 1961 will see a continuation of the "double standard" settlements that were negotiated last year—the large companies will grant one pattern of settlements and a different and lower priced package will be negotiated by the medium and small sized firms.

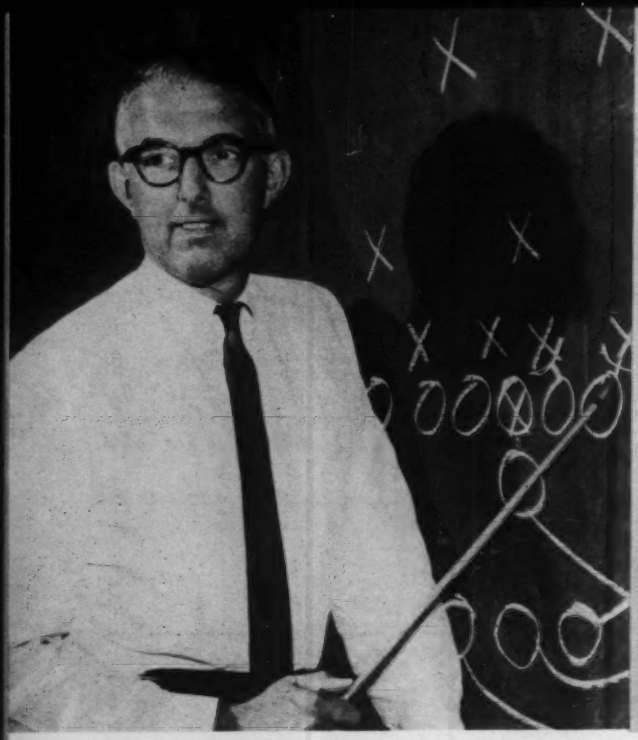


LUCITE TARGET FRACTURES into flower-like pattern after being hit by a burst of electrons. The instrument is a linear accelerator (Linac) built for the Army by Hughes Aircraft Co., Culver City, Calif. The machine produces a short pulse of gamma radiation equal to that of an atomic explosion. It is being used to study the effects of nuclear radiation on missiles

Major Negotiations to Watch in '61

Month Contract Expires	Company or Group	Union	Employees
March	California Metal Trades Assoc.	IAM[1]	6,000
April	Chicago Foundrymen's Assoc. & independent companies	IMFW[6]	5,000
May	Sperry Rand Corp. (Sperry Gyroscope Div.)	IUE[4]	9,500
June	Sperry Rand Corp. (Remington Rand Div.)	IAM	5,600
	Kaiser Steel Corp. (Fontana, Calif.)	USW[2]	6,500
August	General Motors Corp.	IUE	35,000
	Chrysler Corp.	UAW[3]	104,000
	Ford Motor Co.	UAW	132,000
	General Motors Corp.	UAW	340,000
	Raytheon Mfg. Co.	IBEW[5]	13,000
September	Automotive Tool & Die Manufacturers Assoc.	UAW	6,000
	Caterpillar Tractor Co.	UAW	16,000
	Deere & Co.	UAW	13,800
	International Harvester Co.	UAW	33,600
	American Motors Corp.	UAW	20,000
	Bendix Corp.	UAW	13,000
	Curtiss-Wright Corp.	UAW	6,000
October	Budd Co.	UAW	11,000
November	Allis-Chalmers Mfg. Co.	UAW	9,000
	Studebaker-Packard Corp.	UAW	7,500
December	Cast Iron Soil Pipe & Fittings Manufacturers' Negotiating Committee	IMFW	9,000

Source: U. S. Department of Labor.
1. International Association of Machinists. 2. United Steelworkers of America. 3. United Auto Workers. 4. International Union of Electrical Workers. 5. International Brotherhood of Electrical Workers. 6. International Molders & Foundry Workers.



Like a football team, industry requires a minimum of personnel to do a normal job plus some reserves to throw into the gap in an emergency. Temporary help can be your reserves, says Elmer L. Winter, Manpower Inc.'s president

Photos by Manpower Inc.

How Temporary Employees Pay Off

TWO Cleveland companies differed in almost every respect except for a common problem: A shortage of qualified workers to do a short term job. They found a common solution: Hiring temporary workers from a local service bureau.

One, a small manufacturer (with a nonunion shop) developed a new product and suddenly found it needed additional employees to achieve a temporary production buildup.

The other, a large machinery maker (with a strong union) was preparing for a plant-wide inventory, but didn't have sufficient personnel for the task.

Both got their jobs done efficiently with temporary workers and saved time and money in the long run.

• Leasing workers to meet peak period requirements or to do jobs outside the normal routine is becoming an increasingly accepted practice.

Elmer Winter, president of Manpower Inc., Milwaukee, says his company has served more than 65,000 firms, including 98 of the 100 largest in the nation.

While there is some objection to the term "leased labor," it is a leasing arrangement. The people work for you, usually under your direction, in most cases using your equipment on your premises. But they are not on your direct payroll. You pay a flat fee (usually close to the basic wage of the full time workers) to the leasing agency only for the hours worked. That is the end of your responsibility and expense. The agency pays the employee, is responsible for workmen's compensation, bears all the expense of state and federal employment taxes and benefits, pays for the recruiting and interviewing—in short, assumes all the expense and responsibility you assume for all your permanent workers. Several studies have shown that the fringes average 20 to 25 per cent of payroll costs.

• There is scarcely a type of job that bureaus can't fill with temporary workers.

Many plants use them for cleanup and maintenance. Others use them in more skilled positions, such as assembly work or in the draftingroom. Skilled salesmen are available. A few firms have even called for part time engineers. There is practically no end to the number of office jobs that can be done by temporary leased help.

"We are often met with skepticism about the quality of our people," admits William J. Gallagher, vice president of Manpower. "But we find that there is a constant source of good help available on a part time basis. Some people just plain like to work that way. Others are between jobs. Some are new to a community and haven't yet located anything permanent. Retired people are a good source of experienced skills."

So sure is he of the quality of his temporary workers that Mr. Winter declares: "We're willing to match the productivity of our people against that of the permanent staff where they are placed." As a safeguard,

Manpower bonds its people to a limit of $25,000 and carries up to $500,000 liability insurance on them.

• One of the big problems is the union shop, but in many cases part time help is not only recognized as the best solution to peak labor problems but is welcomed by the union.

"In the first place," declares Mr. Winter, "we have always maintained good relations with the unions. In every plant where a union is involved, we clear the use of Manpower with the union. If it objects, we pull out. In the second place, the law allows the manufacturer to have a nonunion man in his plant for 30 days before he is required to join the union. Since temporary workers are seldom involved for periods over 30 days, there often is no problem at all."

Case in point: An old-line producer of material handling equipment has found it desirable for many years to close down his plant for two weeks every July for vacation. He always takes inventory during this shutdown, and until last year he used his own supervisors and plant workers to do the job. However, he found that this caused production problems later when the key people took their vacations.

Last year, after guaranteeing the union that he would allow all permanent employees with less than two weeks' vacation to stay on for the job (plus a few key supervisors), he contracted with Manpower to do the job. Manpower provided 285 inventory takers and 45 supervisors (many college students and teachers on vacation) to work with about 65 permanent employees. The inventory was finished satisfactorily in six working days. The company saved several thousand dollars in labor costs and maintained efficient use of full time people during the rest of the year.

One Midwest manufacturer has used Manpower help for several years to reduce the labor costs of its highly seasonal production pattern. Last year, when the shop was organized by the AFL-CIO, management succeeded in obtaining a clause in the contract which permits it to hire temporary workers from Manpower or any other agency up to a fixed percentage of its total labor force. The part time workers do a variety of jobs—welding, fabricating, assembling, shipping. A top company official points out that "everybody knows this is a seasonal business and, normally, skilled union help is not too interested in it." Many of the part time workers have come back year after year to pick up a few months' pay checks, he says.

• Some of the most important advantages of temporary help are indirect.

A Chicago warehouse used temporary help for two years and reduced its unemployment compensation rating from 2.7 to 0.5 per cent on a $3 million payroll. The savings: $75,000 a year. The cost of the temporary help: $50,000 a year.

"Look at it another way," invites Mr. Winter. "A company hires its own help for temporary work, then has to pay unemployment compensation when workers get laid off. Its rate goes up 2 per cent on a $1 million payroll, or $20,000 a year. If the company makes 5 per cent net profit, it must increase its sales $400,000 to cover the increased cost. By using leased help, the extra sales effort is clear profit."

MODELS work part time at industry shows

DRAFTSMEN are available for part time

MAILING can be done by temporary help

INVENTORY costs are cut by temporaries

GE's Chairman Ralph J. Cordiner (left) calls on Charles E. Wilson, former president, to head the GE study team as . . .

Electrical Firms Offer Restitution

Westinghouse and Allis-Chalmers join GE in setting up teams to visit an estimated 300 customers to see if recent antitrust violations were detrimental to them

AS THE SMOKE begins to clear from the price fixing case, the big three electrical equipment manufacturers involved are buckling down to the tremendous task of making restitution.

Weeks ago, General Electric Co., Allis-Chalmers Mfg. Co., and Westinghouse Electric Corp. acknowledged that violations of the antitrust laws had occurred. GE, for one, took action against some violators in its own ranks. It demoted several managers and reassigned them to posts with no responsibility for prices.

All three firms have pledged restitution to customers where adjustments are warranted. The job won't be easy. The products involved represent an estimated $1.75 billion annual market, reports one source. (The price fixing covered a period of about four years.) Products involved included circuit breakers, transformers, control equipment, switch gear assemblies, turbine generators, and other types of electrical distribution equipment.

GE called back Charles E. Wilson, former president, to head up a company team to study and review transactions with the nearly 300 utility and industry customers involved, including federal, state, and local agencies. C. W. Schweers, vice president and assistant to the president, is in charge of the Allis-Chalmers team; George L. Wilcox, vice president and assistant to the president, has the task at Westinghouse.

All customers involved, says GE, have been notified that a team will be calling on them to determine "if recent violations of the antitrust laws had been financially detrimental" to them.

Compounding the problem of trying to determine any overcharges are these factors:

1. The inflationary forces which have driven equipment prices upward.

2. The product improvement factors which contributed to price increases the customer may have paid.

Though the plans were initiated in December, no meetings have been held with customers, say company sources. Reason: "There's a tremendous amount of research necessary. Each customer must be dealt with individually, and historical studies must be made of what equipment he bought and how much he paid for it. It's practically impossible to come up with a pat formula."

The teams will probably consist of four or five members, including legal, accounting, and sales representation.

Meetings with customers will probably start sometime in March.

Trade Associations Push Hot Dip Galvanizing R&D

The American Hot Dip Galvanizers Association, Washington, and the American Zinc Institute, New York, are uniting in a campaign to expand the uses of hot dip galvanizing. The program, which will be inaugurated early this year, is to stimulate research and development in many fields where hot dip galvanizing is not being used to its fullest potential and to encourage product improvement.

1960 Earnings Trend Downward

THE MAJORITY of metalworking firms failed in 1960 to equal the profit levels attained in 1959. They have entered 1961 with tempered optimism.

Although business clipped along in the first quarter last year, a sag that started in the second quarter lasted throughout the year. Many metalworkers foresee business in 1961 reversing that pattern. While little improvement is anticipated in the first quarter, an upturn in the spring and strengthening in the last half should permit profits to equal or exceed 1960's.

Several factors ring an optimistic note. Inventory liquidation appears to have about run its course and buying should gradually pick up. A rise in construction and record pipeline activity will aid recovery. Stepped up government spending in depressed areas and for defense should act as a stimulus. Several firms report increased foreign sales.

(Net income)

SELECTED COMPANIES	1960	1959
Aerojet General Corp.	$10,097,626	$8,203,323
Aeronca Mfg. Co.	(1,900,000)	680,326
Air Reduction Co.	14,692,381	14,850,600
American Can Co.	35,382,413	40,890,769
American Hoist & Derrick Co.	1,349,834	1,337,004
American Metal Climax Inc.	38,700,000	30,833,000
American Monorail Co.	205,880	136,203
American Motors Corp.	48,243,361	60,045,760
American Radiator & Standard Sanitary Corp.	13,189,000	21,371,257
American Smelting & Refining Co.	23,700,000	12,980,231
American Steel Foundries	7,800,000	7,200,000
Avco Mfg. Co.	10,021,501	9,588,416
Babcock & Wilcox Corp.	17,818,000	15,937,800
Bendix Corp.	26,188,471	27,404,274
Birdsboro Corp.	(41,115)	89,211
Bucyrus-Erie Co.	(9,954,000)	(1,755,428)
Budd Co.	4,743,000	11,040,745
Bullard Co.	(350,000)	(2,577,049)
Case (J. I.) Co.	(39,814,973)	6,200,111
Caterpillar Tractor Co.	42,580,335	46,517,987
Chain Belt Co.	3,648,000	5,012,000
Clark Equipment Co.	6,000,000*	12,400,000
Cleveland-Cliffs Iron Co.	10,090,000	7,200,000
Cockshutt Farm Equipment Inc.	1,299,646	1,813,164
Cooper-Bessemer Corp.	4,279,943	5,425,903
Copper Range Co.	(1,361,042)	2,405,095
Deere & Co.	17,753,212	48,450,751
Douglas Aircraft Co.	(19,429,437)	(33,822,228)
Eagle-Picher Co.	4,767,088	4,671,646
Electrolux Corp.	3,575,000	3,034,512
Emerson Radio & Phonograph Corp.	1,686,568	2,668,682
Ex-Cell-O Corp.	8,245,383	8,026,883
Ferro Corp.	2,556,000	3,331,000
Foote Bros. Gear & Machine Corp.	865,919	1,341,582
Ford Motor Co.	427,885,948	451,367,367
Gar Wood Industries Inc.	(1,058,827)	152,131
General Electric Co.	200,100,000	280,242,123
General Motors Corp.	959,000,000	873,100,149
General Steel Casting Corp.	1,922,720	2,018,499
Grumman Aircraft & Engineering Corp.	7,194,292	4,938,308
Harvey Aluminum Inc.	5,007,837	4,480,535
Hupp Corp.	1,005,000	2,110,407
International Business Machines Corp.	168,180,880	145,633,212
International Harvester Co.	53,718,298	84,298,869
Jack & Heintz Inc.	1,190,000	640,000
Johns-Manville Corp.	26,508,000	31,615,989
Joy Mfg. Co.	5,602,604	5,419,635
Kaiser Aluminum & Chemical Corp.	22,771,000	22,328,000
Kawneer Co.	1,572,933	1,881,794
Kennecott Copper Co.	77,395,187	57,340,111
Koehring Co.	224,000	2,386,000
Koppers Co.	7,474,000	5,832,000
Magnavox Inc.	6,500,000	4,679,458
Mallory, P. R., & Co.	4,367,403	4,339,042
Martin Co.	16,000,000*	13,300,000
Michigan Seamless Tube Co.	1,456,282	1,675,621
Miehle-Goss-Dexter Inc.	5,001,189	3,976,326
Minneapolis-Honeywell Regulator Co.	26,228,539	29,399,399
Minneapolis-Moline Co.	2,445,141	3,238,389
Mueller Brass Co.	287,276	1,919,075
National-Standard Co.	2,914,000	3,769,000
Outboard Marine Corp.	12,568,000	13,785,000
Raytheon Co.	11,536,000	13,481,188
Reliance Electric & Engineering Co.	4,752,000	4,236,000
Rockwell Mfg. Co.	8,500,000	9,720,000
Signode Steel Strapping Co.	4,108,035	4,835,492
St. Joseph Lead Co.	2,972,068	6,263,076
Standard Forgings Corp.	362,046	668,589
Steel Improvement & Forge Co.	79,166†	257,556
Studebaker-Packard Corp.	708,850	28,544,338
Union Carbide Corp.	157,980,000	171,637,000
Union Tank Car Co.	7,820,242	6,543,159
United Engineering & Foundry Co.	4,958,294	6,073,193
Westinghouse Electric Corp.	79,057,000	85,947,000
Woodward Iron Co.	4,976,000	5,486,357

Most Steelmaker Profits Reflect Low Operating Rate

(Net income)

SELECTED COMPANIES	1960	1959
Acme Steel Co.	$2,202,975	$3,616,481
Alan Wood Steel Co.	1,437,000	4,856,000
Allegheny Ludlum Steel Corp.	8,750,209	11,290,664
Armco Steel Corp.	70,459,000	77,064,249
Bethlehem Steel Corp.	121,179,549	117,235,859
Colorado Fuel & Iron Corp.	(1,196,625)	4,364,554
Copperweld Steel Co.	2,441,781	5,972,457
Crucible Steel Co. of America	1,240,000	6,106,443
Granite City Steel Co.	11,121,000	16,142,000
Inland Steel Co.	47,050,611	48,354,030
Jones & Laughlin Steel Corp.	33,153,000	29,485,000
Kaiser Steel Corp.	(8,216,000)	(7,401,000)
McLouth Steel Corp.	16,418,934	10,058,232
National Steel Corp.	41,937,235	54,897,360
Phoenix Steel Corp.	(1,922,289)	2,108,754
Pittsburgh Steel Co.	1,026,475	(994,310)
Republic Steel Corp.	52,846,373	53,890,116
U. S. Steel Corp.	304,520,681	254,563,401
Wheeling Steel Corp.	8,277,000	7,033,000
Youngstown Sheet & Tube Co.	25,719,166	30,956,040

( ) Indicates loss.
*Estimate.
†Includes special credit.

How Soon Can Kennedy Program Affect You?

Distressed Area Development . . .

At least six months after passage by Congress.

Defense Procurement Acceleration . . .

Airlift orders are being increased and Polaris orders are being speeded up now.

New Housing & Construction . . .

Speedup of present programs will take two months; new programs will take six months.

Tax Incentives for Capital Spending . . .

If passed, they will probably cover spending since Dec. 31, 1960.

Export Expansion Programs . . .

Direct loans to firms doing business overseas could be made immediately.

METALWORKERS watching President Kennedy's program move ahead are asking: "When will we feel the impact?"

The timetable above indicates what the President can do and what he must wait for Congress to do. He has been able to prime the economic pump quickly by speeding up the production of five Polaris submarines ($100 million each) ten months ahead of schedule (four of the five go to private shipyards), and he has ordered the Air Force to procure 53 air transports. But he must wait for Congress to O.K. a $300 million, distressed area program. He has told the Federal Housing Administration to lower the maximum allowable interest rate on FHA insured home mortgages; but broad new programs in construction are at least three months from Congressional passage—maybe six months.

The President can order the Export-Import Bank of Washington to submit "a new program" that will give our exporters the same sort of government aid foreign exporters get from their governments. Direct loans to exporters are reportedly under consideration.

● MINIMUM WAGE OUTLOOK—The Kennedy administration has shown some willingness to compromise in its plan to boost the minimum hourly wage. During the campaign, the President demanded an immediate boost to $1.25. Now he is willing to take three years to achieve it—$1.15 this year, $1.20 next year, $1.25 in 1963.

● SPOTLIGHT STILL ON EXPORTS—The President is attempting a delicate juggling act: Protect the domestic economy from further trouble, while he is cementing relations with our allies who must sell to us to live. Exports are the key. He particularly looks to small firms to boost their exports.

Last week, the President reaffirmed his position on the side of free trade: "A return to protectionism is not a solution. Such a course would provoke retaliation . . ." Instead, he guarantees to maintain the price of gold, boost exports, and investigate the use of "tax havens" overseas such as Liechtenstein, Luxembourg, Bermuda, and the Bahamas.

He is moving on this program slowly. By Apr. 1, he will have received reports from the Treasury and Export-Import Bank and should have developed a full program for increasing exports through the Commerce Department.

President Kennedy has endorsed Mr. Eisenhower's budget request for continuing the export boosting program, including the addition of 41 commercial attaches to U. S. embassies and increasing the Commerce Department's trade mission abroad. The President said he was ordering rapid completion of new U. S. trade centers in London and Bangkok and said he might add new centers next year in Africa, Latin America, and Europe.

● ATTITUDE ON BUY AMERICAN POLICY—He gives little ground to the protectionists on the Buy American issue. He claims that only 20 per cent of our foreign assistance program, which cost $2.6 billion last year, is being spent overseas. That policy will continue, he says, and he promises to emphasize the purchase of U. S. goods for our armed forces abroad, even though the cost will be higher.

● GOLD FLOW—The President blames most of the gold flow difficulties on last year's large movement of short term capital overseas seeking higher interest rates. He said he was hopeful that the Federal Reserve Board would co-operate in helping to hold up short term interest rates to minimize gold outflow while at the same time bringing down long term rates to help stimulate the economy. At the same time, President Kennedy denied that his administration intended to seek any new authority over domestic interest rates.

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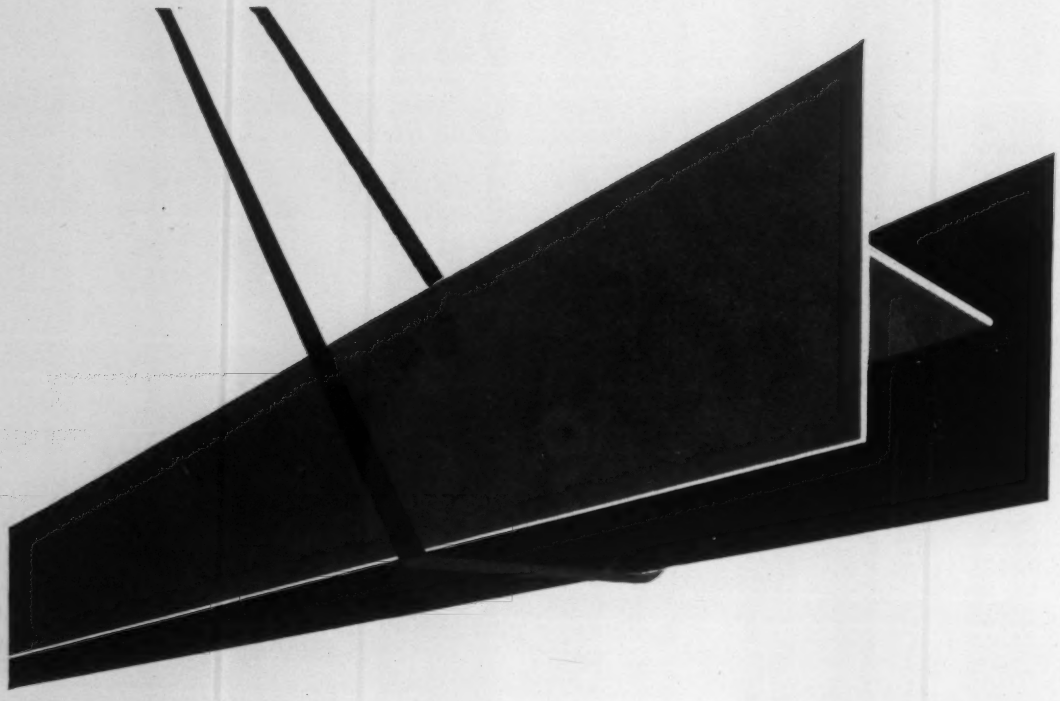

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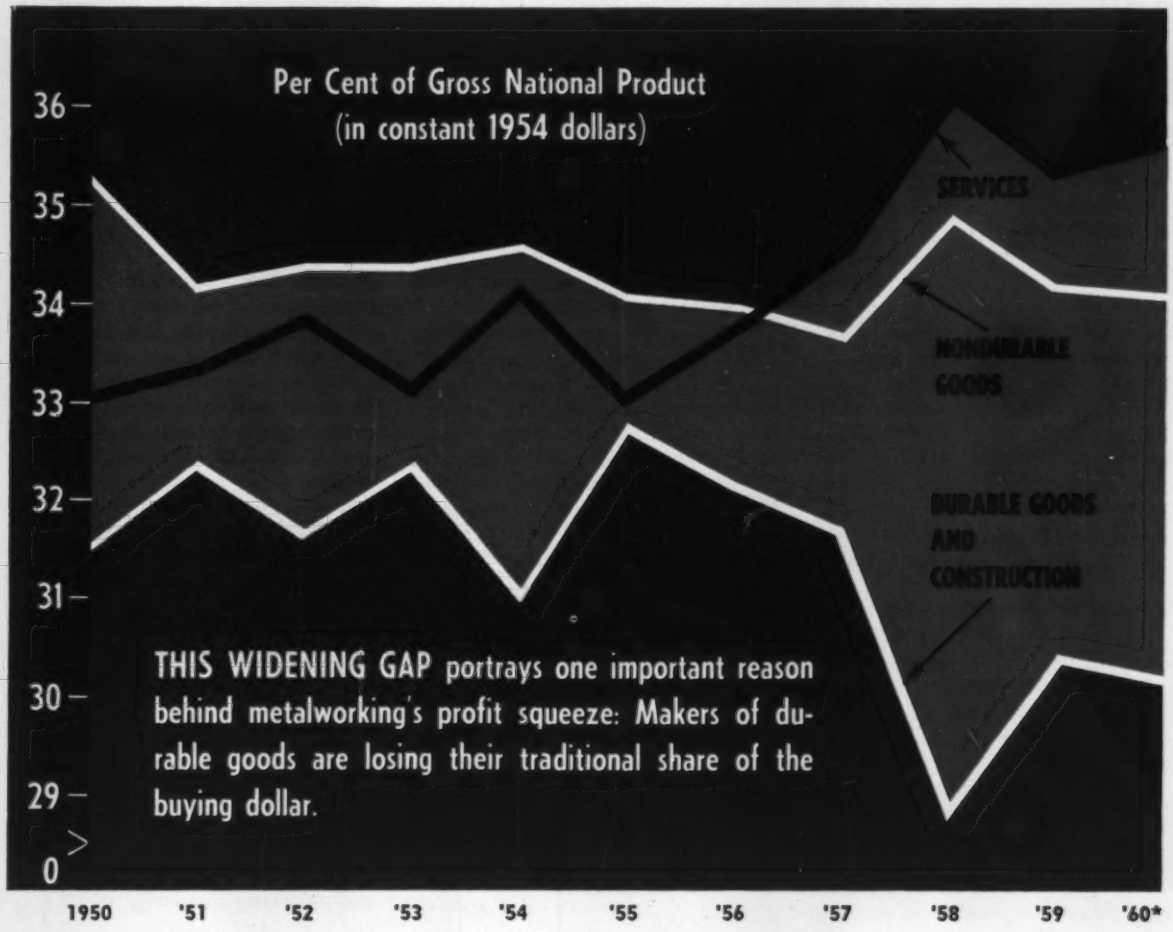


Based on Commerce Department statistics representing total purchases by all segments of the economy.
*First nine months.

Our Fight for the Buying Dollar

METALWORKING managers must find ways to make metal products more attractive to a buyer who is spending an increasingly larger share of his dollars for services and nonmetal items (see chart on Page 74).

How Serious?

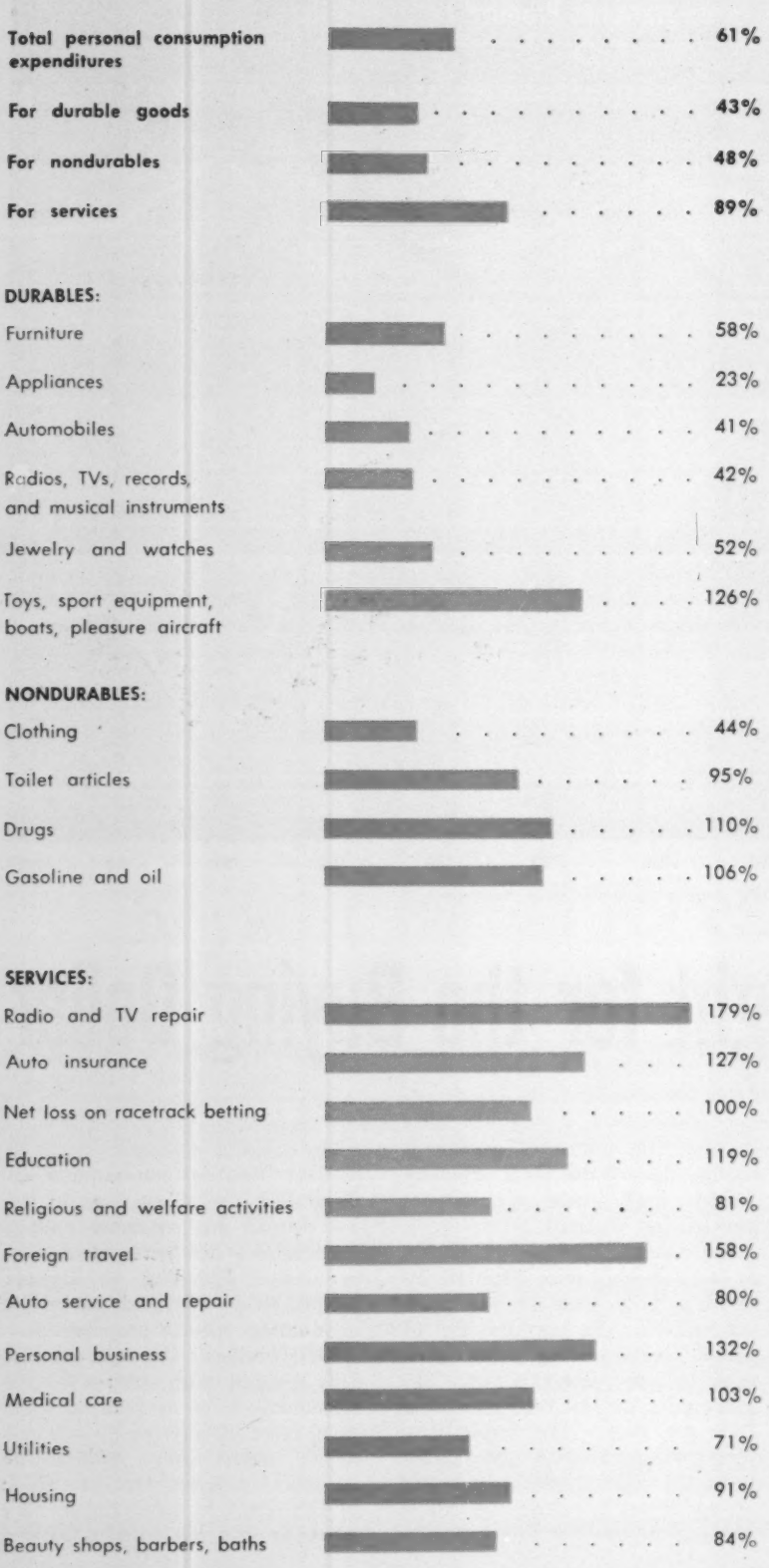
Metalworking must find new ways to grow. Measured in any manner, the industry's growth is lagging that of the U. S. economy (which itself, some say, is not growing fast enough).

For example, compare the growth in metalworking sales with the increase in U. S. gross national product (GNP). During the 1951-57 period, metalworking sales averaged 31.3 per cent of GNP. The average for the last three years was 28.9 per cent. The implication: Had we maintained the earlier ratio, the industry would have sold an additional $10 billion worth of products in the last three years.

Or examine consumer spending patterns. Personal consumption expenditures rose 61 per cent in the last decade, but consumer outlays for durable goods increased only 43 per cent. Spending on services jumped 89 per cent and outlays for nondurables rose 48 per cent.

Metalworking's failure to successfully compete with services for the consumer's dollar is brought home even more vividly when you examine discretionary outlays—the portion of a person's income which he can spend in any manner. It's what he has left after deducting

Consumers Shift Spending Away from Durable Goods



major fixed commitments (installment debt, insurance and pension payments, real estate taxes, rent) and essential outlays (food, clothing, utilities, medical care and death expenses, purchased local transportation).

With rising living standards, discretionary outlays are becoming larger in proportion to total consumer outlays. During the first half of the last decade, discretionary outlays equaled 41.9 per cent of consumer expenditures. The figure rose to an average of 43.8 per cent during the last five years of the 1950s.

But metalworking isn't holding its traditional share of that spending. Given a choice of where to put his dollars, the consumer is pouring a larger portion into services and nondurables. During the 1950-55 period, durable goods got an average of 33.3 per cent of the discretionary outlays. During the 1956-59 period, durables got only 30.6 per cent. Makers of nondurable goods hiked their share from 34.2 per cent in 1950 to 37.9 per cent in 1959. And the share going to services climbed from 30.1 per cent in 1950 to 31.6 per cent in 1959.

Makers of industrial machinery have watched their share of the dollar slip too. In the postwar period, investment in producers' durable equipment has averaged 6.3 per cent of gross national product. In the last three years, it averaged only 5.4 per cent.

Metalworking's failure to grow at a satisfactory rate has serious implications for the entire U. S. economy. Durable goods is a key sector for creating more jobs and income. As the First National City Bank of New York puts it: "If the economy is to grow rapidly, the heavy industries must lead the way. Growth in gross national product which is largely confined to nondurable goods and services, no matter what percentage rates are achieved, will not permit balanced development of the nation's strength or productive capacity."

How can metalworking reclaim the share of the buying dollar that it grasped during the earlier postwar years but has recently lost? Answers are suggested when you examine some of the main reasons for the loss:

A Shifting Population

Since World War II, the U. S. has undergone an important change in the family structure. The average family today is older, with children making different demands on the family coffer. The teenage population is soaring—and teenagers require hefty amounts of cash for food, clothing, school, medical bills, toilet articles, drugs, sports equipment, and a myriad of incidentals. The family with teenagers is forced to spend a greater portion of its income on services. And the cost of services has been rising unrelentingly.

The teen group does offer some interesting market possibilities to metalworking though. For tips on selling the teen market, see STEEL, Feb. 6, pp. 40-42.

More Time to Play

The last decade has also brought about a dramatic increase in the amount of leisure time that the average worker enjoys. So he is doing more reading, traveling, and gambling. He's also spending more money on education. And he has become a hobbyist. The bulk of spending in those areas is channeled into services and nondurable goods. But this market has considerable potential for metalworking. The challenge to the metalworking marketer is to attract this man to spend his leisure hours in a different manner—one beneficial to metalworking. Examples: Sperry Piedmont Co., Charlottesville, Va., is marketing a special radar set for small pleasure and fishing boats. Himalayan Assault Pak Co., San Jose, Calif., is selling a tubular aluminum shoulder carrying pack for camping gear—with two short legs that swing down to form a canvas easy chair. Camp-N-Wagon, Pasadena, Calif., makes a complete kitchen that fits into the back of a station wagon.

A Wary Consumer

Numerous surveys have shown that a sizable group of consumers has gone on strike against poor dependability, or lack of durability, common to some metal products. One survey, conducted by *Ladies' Home Journal*, found wide dissatisfaction with appliances: 13 per cent of refrigerator owners, 19 per cent of washer owners, and 16 per cent of dryer owners "felt they had problems severe enough to make them concerned. . . ."

Appliance makers aren't alone. Nor is the problem peculiar to consumer goods. The "unreliable" charge has been hurled at makers of industrial equipment, basic materials, components, defense products, almost all of metalworking.

But the industry recognizes the problem and we are taking the initial steps in an impressive march for reliability. The payoff can be great. The less cash the customer must spend for service and repair, the more money he will have available to buy hard goods. In 1959, for example, consumers shelled out $784 million for radio and TV repair and more than $4.5 billion for auto service and repair. A 10 per cent reduction in those two areas alone would give the consumer $532 million he could spend elsewhere.

The customer is also rebelling against price increases. Joel Hunter, president, Crucible Steel Co. of America, says: "I think we are in a different kind of marketing era in which we will have to think more about better quality and lower costs than about getting more from our customers through price increases."

An Unexcited Buyer

Part of metalworking's problem lies in failure to come up with innovations that excite the potential buyer. Too many of today's products are simply 1961 versions of 1940 items. To be sure, there have been some noticeable improvements. But the basic principles are pretty much the same. Metalworking has erred by failing to devote enough effort to finding out what the customer will buy.

Managers must become more closely attuned to sociological trends; they create economic opportunities. For example, American Steel & Wire Div., U. S. Steel Corp., is capitalizing on the fact that people are taller today. The firm is promoting bigger beds—with bigger innerspring mattresses, of course.

Metalworking can no longer rely on growth from accidental innovation. In business as in politics, revolutions must be planned. Product revolutions spring from ideas. Ideas are generated by programed research—on a continuing, not a sporadic, basis. Management must recognize that it can provide for the occurrence of new and unpredictable invention — through applied research. We frequently experience an excruciating time lag between new knowledge and new product, between new concept and innovation. That is sometimes due to our failure to find out what the customer will buy, then translate our new knowledge into a product that will fill those wants.

That is done not simply by being "research oriented" or "market oriented" but rather by being "customer oriented." As a spokesman for Whirlpool Corp. puts it: "Too often, emphasis is placed on the wants or opinions of the middleman—not enough on the desires of the ultimate consumer."

The consumer was considered by Whirlpool, Norge, Philco, and Westinghouse in introducing their new, coin operated, dry cleaning appliances. Norge's president, Robert H. Quayle Jr., told STEEL that the coin-operated dry cleaner "could very well be the forerunner of the waterless washing machine . . . which would go a long way toward creating an opportunity for two and three washers in every home." Says Mr. Quayle: "We would then start to share the consumer market on an entirely different basis."

Apparently, Mr. Quayle recognized the flaw in the widespread current belief that the principal problem in the appliance and other industries is market saturation. The market is saturated only if the industry thinks of itself in a historical sense. Almost every home does have a washing machine, a refrigerator, and a range. But the market for cleaning clothes, preserving food, and cooking is far from saturated. And it will never be sated as long as radically new ways to perform those functions can be conceived. Thermoelectric cooling opens the door to compact refrigerators in the den, the diningroom, the basement, the recreation room. David Susskind, Jack Paar, and midnight movies have helped to create a sect of Americans who eat

How to Get People to Buy More Steel

U. S. Steel Corp. has swung into action on a broad front to expand present markets for steel and to develop new markets for the metal. STEEL asked Roger Blough, chairman, to spell out the corporation's approach. . .

Every sale of steel involves three basic decisions, Mr. Blough points out. First, someone—housewife, farmer, businessman, public official—must decide to buy something which is made or can be made of steel. Next, someone—the ultimate consumer or an architect, engineer, designer, or production man—must decide to make the product of steel and not of a competing material. Third, someone must decide from what source the steel will be purchased.

So U. S. Steel—like any material supplier—must convince a highly heterogeneous group of people to make each sale of its product. Mr. Blough says that is done by serving a function rather than just selling a product. He says that no company is too small to make use of that kind of approach, nor is any firm so large that it can shoulder the entire task.

Among the recent U. S. Steel efforts to serve a function. . .

- It developed a new machine to take the work out of fence building and a speedier tool for fence splicing.
- It is producing a lighter, thinner tin plate that will find uses other than in canmaking. Examples: Disposable baking pans, frozen dinner trays, packaging.
- It developed steel vessels for gas storage that withstand pressures up to 8800 psi.
- It produced 900 lb bearings to pivot the dome of Pittsburgh's new Public Auditorium.
- It developed an auto dealer sales training kit to help merchandise cars.
- It has a new protective device for rail shipment of coiled tin mill products.
- It has produced numerous movies aimed at specific markets. Among them: "Curtain Time," tailored to the professional interests of architects.
- It is turning out a new 9 per cent nickel steel for storage of gases at temperatures as low as −320° F.
- It is producing vinyl coated steels that can be embossed with any texture that can be engraved on a printing roll.
- It has developed "USS Strux," a tough alloy with an extremely high strength to weight ratio, that is solving problems in the aircraft and missile industry.
- It has developed a continuous fluoroscoping process to reveal hidden flaws in welded seams of steel pipe.
- It sponsored a study with Peter Muller-Munk & Associates, industrial design firm, to develop design concepts that will enable less steel to do more work.

With such programs—many of which should suggest new approaches for other firms—U. S. Steel hopes to capture a bigger market for all kinds of steel products. The key is in giving added benefits to the customer by reducing costs and improving products. Says Mr. Blough: That is the great challenge to metalworking today.

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while watching TV through their toes. That seems to open a market for wall television in bedrooms, bedside refrigerators and food warmers, and beds that change position with the push of a button.

Marketing opportunities that are created in that way often go unnoticed—except by the progressive firm that recognizes the value of investing money in comprehensive market research.

Today's competition for the buying dollar — while intense — will probably seem mild by comparison in a decade or two. Success—even survival—will depend more and more on the ability to predict what the customer will buy and to rapidly translate new knowledge into new products that will fill those customer desires.

Example: Georgia's Viking Distillery, a licensed manufacturer of moonshine, hiked its sales from $700,000 in 1957 to $8 million last year simply by changing its package. Instead of the narrow-necked bottle, the firm markets its "Georgia Moon" in Mason jars.

PLAN FOR PROFIT GROWTH

Our Challenge from Nonmetallics

On Feb. 27, STEEL will pinpoint the nonmetal items that are cutting into metalworking markets and suggest ways to fight back. For a free copy of any or all articles in this series (appearing biweekly since Jan. 16), write: Editorial Service, STEEL, Penton Bldg., Cleveland 13, Ohio.

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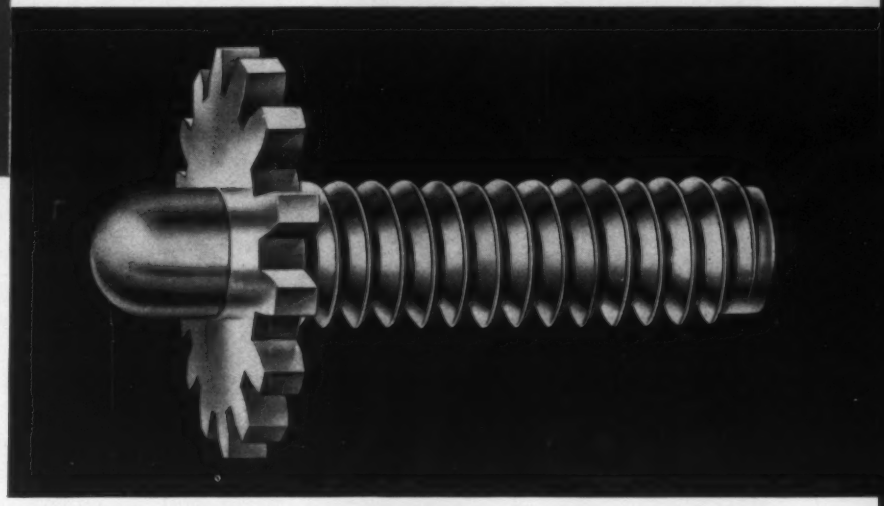
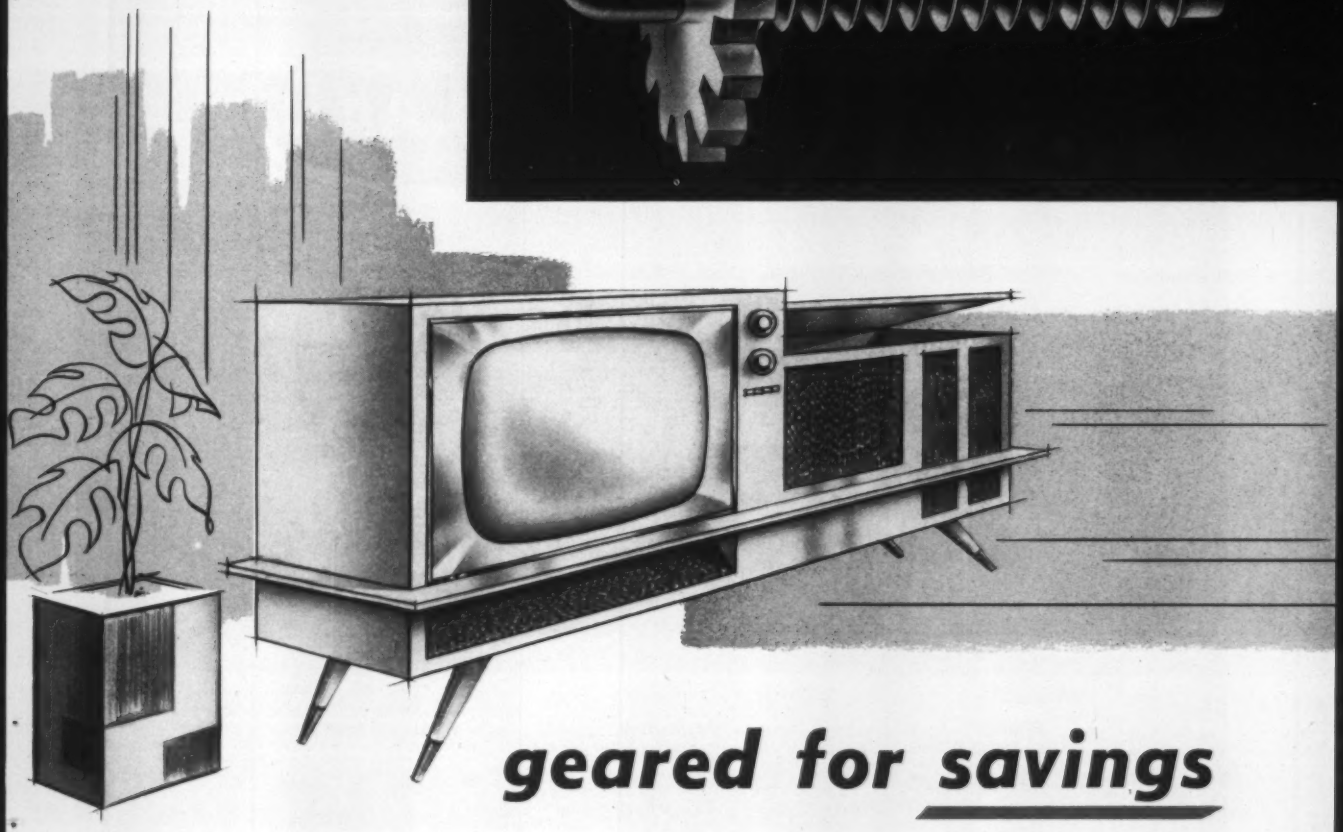
INDUSTRY





geared for savings

For almost two decades, Great Lakes Screw Corporation has been creating precision fasteners for the Radio Television industry. The gear head tuning screw pictured is typical of the "Specials" that GLS Engineers have made standard to provide the economies and strength of cold heading with the close tolerances normally found only in expensive screw machine parts. If your product contains "Specials" which, due to close tolerances or complex design, you feel can only be made on an expensive screw machine — Call the man from GLS and let him show you how the part pictured above saved one of the countries largest television manufacturers over $75,000 per year. GLS can do this for your product too. *We're geared for savings.*

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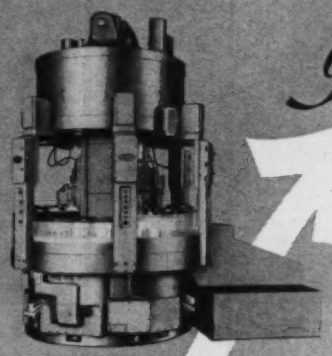

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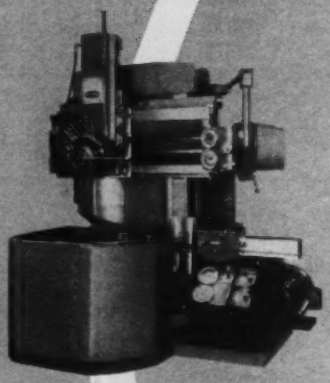

Dynatrol V.T.L. and Vertical Boring & Turning Mill
26" to 86" in 10" increments and 108", 124", and 144" table sizes.

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For fully automatic operation, can be applied to any or all heads of Dynatrol at time of ordering or at a later date.

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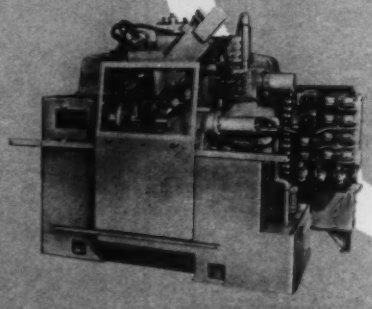
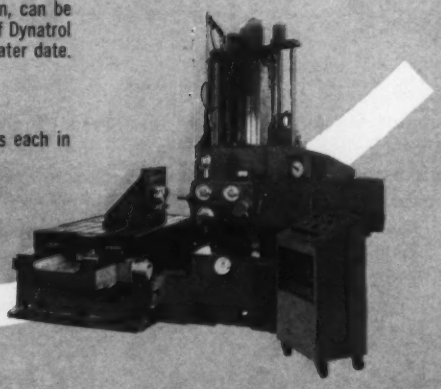
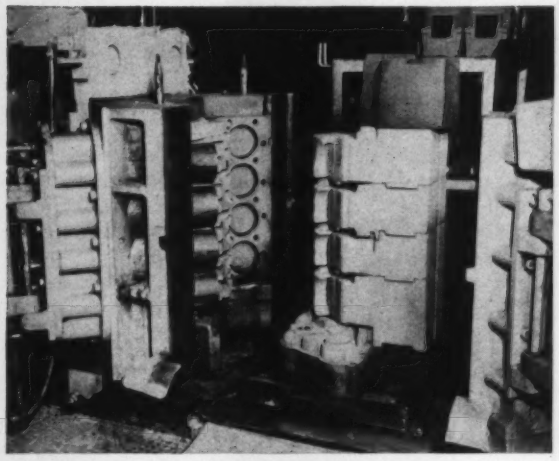
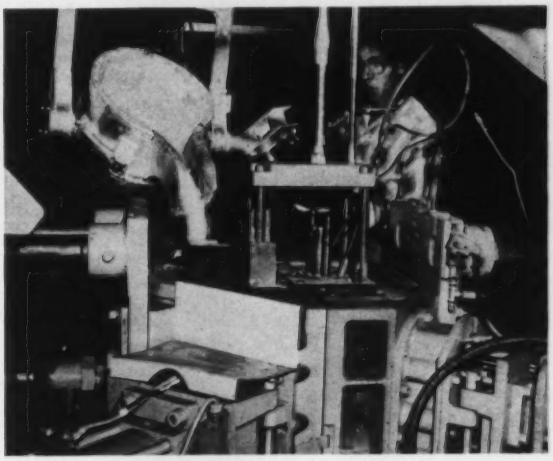


Hydra-Feed Lathe
Automatic and tracer models each in four sizes.

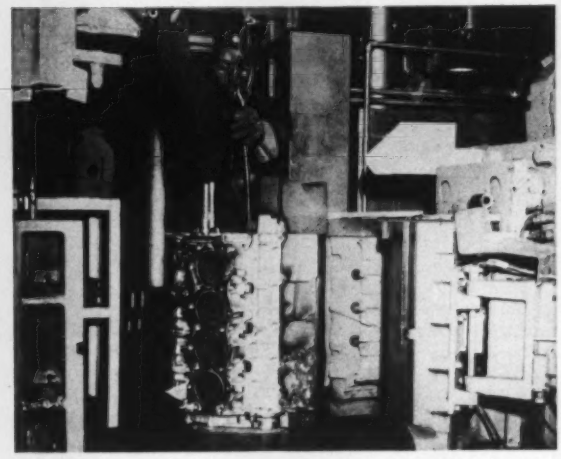




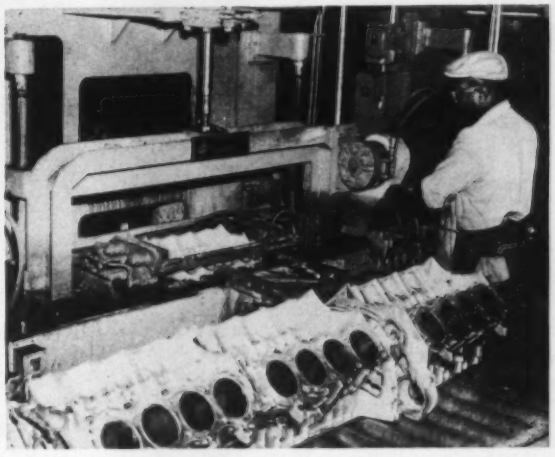
Dry sand forms pouring box and cores . . .



Aluminum is poured into casting machine . . .



Casting removed from semipermanent mold . . .



Blocks are pressure tested under water . . .

What GM Thinks of Aluminum Engines

DETROIT HAS HEARD much conversation about difficulties in casting and machining water cooled aluminum engines. It hailed as significant the report that Chevrolet will use gray iron for its upcoming family of powerplants, even though GM will probably stick to aluminum blocks for its compacts.

But new support for aluminum comes from GM's Central Foundry Div. plant at Defiance, Ohio, which makes blocks and heads for Oldsmobile F-85s, Buick Specials, and Pontiac Tempests. (Their engines are water cooled.) James Smith, division general manager, says that initial production headaches were normal. He also reports that warranty claims aren't higher than they are for gray iron engines.

Since the line started up last July, Defiance has shipped 125,000 blocks and 250,000 heads (12 million lb of aluminum castings). Most of them go to Buick for machining and assembly. Oldsmobile builds its own heads. Defiance plant officials say the major casting problems have been porosity and shrinkage. They say hard spots have not caused trouble, adding that most of the problems have been cured by redesigning cores, regating, and by adjusting pouring rates. Workers have been given off-the-job and on-the-

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job training to familiarize them with the differences between aluminum and gray iron casting techniques.

• **Why Not Diecast?**—GM casts its engine components in semipermanent molds, while Chrysler and American Motors Corp. use diecast blocks which generally are considered cheaper to produce. Admits Mr. Smith: "If the engine design would have permitted it, I believe we probably would have made the blocks as diecastings."

Explaining why GM didn't go the diecast route, Tom Wiltse, Defiance's plant manager, says: "Semipermanent molding obviously was the most reliable method for the time we had to put this program into production. The design of the engine was such that 80 or 90 metal chills (inserts) would have been needed for sand molding. Coring problems made full permanent molds and diecasting impossible."

During process development, Central Foundry discovered that oil cores wouldn't shake out properly. Shell cores gave off too much gas and lacked collapsibility. Production started with CO_2 cores, but Defiance soon found that it couldn't make thick enough sections; shelf life of the cores was too short; and shakeout was difficult. It adopted a urea formaldehyde sand mixture which proved successful. Six sand cores go into each block. Conventional coremaking equipment is used.

• **Uses 356 Alloy**—Defiance buys only secondary aluminum which is melted and fluxed in four, gas fired, 40,000 lb furnaces. Sample slugs from each heat are analyzed by a direct reading quantometer. The molten metal is tapped directly into 1000 lb delivery ladles and transported by special truck to 1700 lb holding pots on the molding line.

Blocks are cast vertically in hydraulically operated, water cooled molding machines located on raised platforms. Each machine has seven die sections. Thermocouples attached to each section relay temperature information to a master recorder so the operator can control water cooling. The system is now controlled manually, but Defiance intends to make its operation fully automatic.

• **Doesn't Check Liners**—All the industry's aluminum engines use gray iron liners, but unlike AMC, GM has not found it necessary to check each liner for cracks. The liners are preheated to 600° F on the line and located in the molds on retractible mandrels. About 80 lb of metal is ladled into each mold in 11 to 14 seconds. Pouring used to take 18 to 20 seconds, but production engineers find the faster rate works better. Mr. Wiltse says the plant gets a 70 per cent yield on its aluminum casting operations.

After castings are hoisted from the molds, they are lowered through openings in the platform floor onto a belt conveyor running beneath the line. They cool for 2 hours, then are trimmed and cleaned in a variety of milling, shakeout, and shotblasting operations. They're aged for 5 hours at 400° F, then water tested for leaks. Although Central Foundry was prepared to impregnate every block, Mr. Wiltse says only 25 per cent have to be dunked.

Blocks (but not heads) slide down a roller conveyor from the water test to an automatic qualifying machine which locates on four positions and mills end and side targets in relationship to cylinder bores. A final dimensional check is made on an air-electronic gage that checks location and surface finish of 22 areas.

• **Reliability**—The Defiance plant makes 80 quality control checks during the aluminum casting process. Among them is a radioisotope lab check using ytterbium which has a half life of 32 days. Two samples are taken daily to check for voids behind the cylinder liners.

The finished block weighs 76 lb including 18 lb of gray iron liners. That's equal to 2 lb per horsepower, and Mr. Smith says it's the lightest aluminum block in the industry. A comparable gray iron block for the larger Oldsmobile engine weighs 250 lb.

Heads are cast in a similar manner although the pouring cycle is only 6 to 9 seconds. On the head line, molten metal is poured directly through the risers instead of the sprue. Two gas vents are inserted in riser openings after pouring to help prevent blowholes caused by excessive core gas buildup.

U. S. Auto Output

Passenger Only

	1961	1960
January	414,498	688,731
February	.....	659,323
March	.....	654,242
April	.....	582,909
May	.....	611,226
June	.....	613,147
July	.....	434,377
August	.....	305,527
September	.....	407,685
October	.....	617,816
November	.....	597,132
December	.....	522,239
Total	.....	6,694,354

Week Ended	1961	1960
Jan. 7	74,204	163,249
Jan. 14	110,808	173,713
Jan. 21	94,155	175,060
Jan. 28	96,057	173,231
Feb. 4	101,558†	164,027
Feb. 11	92,000*	153,186

Source: *Ward's Automotive Reports.* †Preliminary. *Estimated by STEEL.

Exhaust Notes

• Cast, instead of forged, connecting rods will be introduced on one General Motors car in 1962, reports James Smith, general manager of GM's Central Foundry Div. Mr. Smith says the cast rods (made from Armasteel) will be less expensive.

• Deodorizing of urea core sand is a project nearing completion at GM's Research Laboratories in Warren, Mich. Tech Center researchers think they have an odorless substitute that will work just as well as formaldehyde, but won't cause gripes and grievances from coreroom workers.

• Movie film strips are being used by the Reliability Dept. at GM's Central Foundry Div. to help train workers to avoid mistakes. A movie is taken of each man as he runs through his normal equipment operating cycle. Films are then shown to the man in his training group and suggestions for correct procedure follow.

• Controlling coreroom atmosphere in winter when windows and doors can't be opened has been solved at GM's Central Foundry Div. To replace air blown out while getting rid of core oven gas in the 5000 sq ft coreroom, the plant sucks in outside air and heats it by passing it over three natural gas flues.

Ernst cuts steel costs to customers up to 10% with three new Wean Coil Processing Lines

Jim Moon, sales engineer of McKay Machine (above left), represents Wean Equipment Corporation in the Buffalo area. During a recent call on Ernst Iron Works, Division of Ernst Steel Corporation, Jim talked with Carl Grosse, Plant Superintendent, about the three Wean coil processing lines recently installed by this major metals warehousing firm.

According to Mr. Grosse, the Wean slitting, shearing and coil banding lines have reduced Ernst's handling, labor and scrap costs up to 10%. In addition to providing lower costs to Ernst's customers, this modern coil processing system helps this firm give fast service while easing inventory and supply problems through the purchase of standard size coils.

Equipped with modern, automatic controls, the Wean coil processing lines are operated by only four men and can handle 20,000 lb. coils, up to 54" wide and from .015" to .135" thick.

The McKay Machine Company, sales representatives for Wean Equipment Corporation to the metalworking and warehousing industries, will be able to assist you with complete engineering and technical information in planning your slitting and shearing requirements. Why not contact a McKay sales engineer to see how Wean coil processing equipment can help lower your costs.

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WEAN EQUIPMENT CORPORATION
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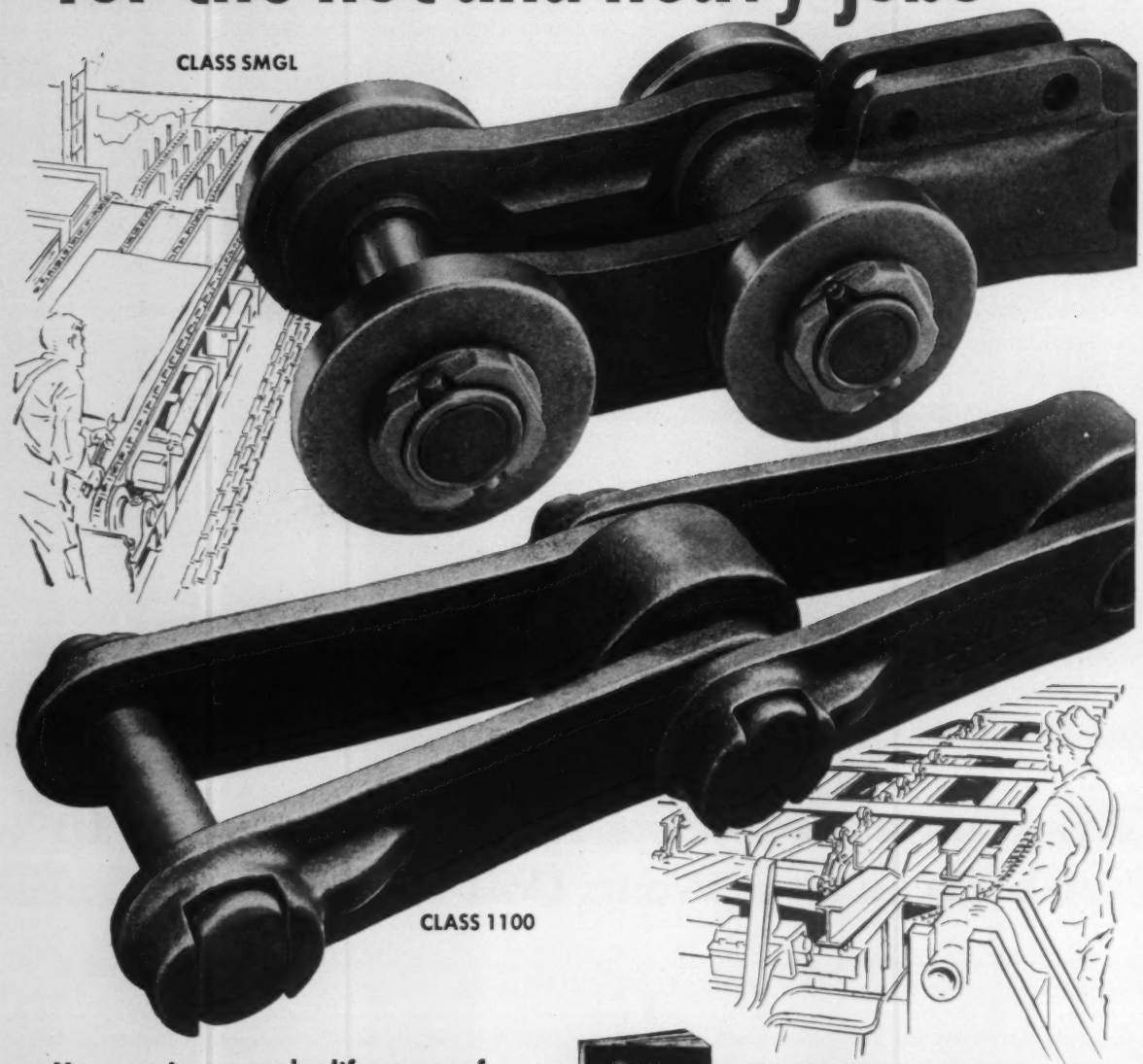

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CLASS SMGL combination chains are designed specifically for furnace conveyor service. Sidebars and center links are made of "file-hard" Promal, with bosses on sidebars to reduce stress on free-floating pins. CLASS 1100 roller chain is ideal for horizontal or inclined rolling elevators and conveyors.

Full design information on both is contained in Catalog 1050. Your Link-Belt representative will counsel on chain selection for high temperature conditions.

Full information on these chains . . . plus a broad line of attachments and sprockets—is contained in Catalog 1050. Get your copy by writing direct . . . or call your nearest Link-Belt office or authorized stock-carrying distributor, listed under CHAINS in the yellow pages of your Phone Directory.

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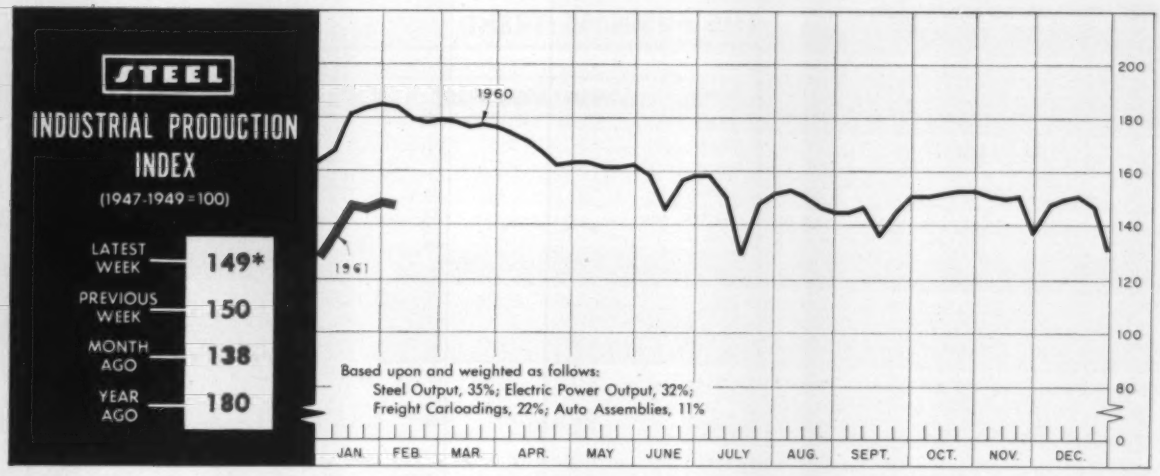
LINK-BELT COMPANY: Executive Offices, Prudential Plaza, Chicago 1. To Serve Industry There Are Link-Belt Plants, Warehouses, District Sales Offices and Stock Carrying Distributors in All Principal Cities. Export Office, New York 7; Australia, Marrickville (Sydney); Brazil, Sao Paulo; Canada, Scarboro (Toronto 13); South Africa, Springs. Representatives Throughout the World. 15.075



*Week ended Feb. 4.

Electricity Usage Sustains Index

COLD WEATHER is playing tricks with STEEL's industrial production index (above). Increased use of electricity added unexpected strength to the late - January - early - February trend line, overshadowing the continuing decline in manufacturing industries.

To set the record straight, it should be noted that auto production has been following a steady decline since late December, and no letup is in sight. And steel production is on a plateau, after starting out the year as if a recovery were at hand.

• **Power at Record** — Since early January, the consumption of electric power has added a little over 6 points to STEEL's index. It has been the main force in keeping the trend line on a level with the November-December readings of around 150 (1947-49=100). The gain is explained by record low temperatures and a rising need for heat rather than any new burst of demand from industry.

At 15.361 billion kw-hr for the week ended Jan. 28, output was well above the pre-Christmas record, which again could not be traced to unusual industrial activity. Another near peak output is anticipated for the week ended Feb. 4—again because of the weather.

Normally, power output is an important indicator of economic well-being. Along with gas consumption, it accounts for nearly 5 per cent of the Federal Reserve Board's industrial production index. Since both have been somewhat above the seasonal pattern in demand, it would not be surprising if they moderated a further decline in the FRB's index for last month.

• **Steel Holding Steady** — While steel mill operations have not gained since mid-January, they haven't fallen either. The American Iron & Steel Institute reports output for the week ended Feb. 4 totaled 1,492,000 tons of steel for ingots and castings, a slight gain over the previous week. Operations had been ex-

BAROMETERS OF BUSINESS

	LATEST PERIOD*	PRIOR WEEK	YEAR AGO
INDUSTRY			
Steel Ingot Production (1000 net tons)	1,500[1]	1,492	2,687
Electric Power Distributed (million kw-hr)	15,000[1]	15,361	14,097
Bituminous Coal Output (1000 tons)	7,060[1]	7,080	8,920
Crude Oil Production (daily avg—1000 bbl)	7,200[1]	7,198	7,293
Construction Volume (*ENR*—millions)	$346.4	$269.2	$377.4
Auto, Truck Output—U. S., Canada (*Ward's*)	132,425[1]	122,605	200,973
TRADE			
Freight Carloadings (1000 cars)	475[1]	473	588
Intercity Truck Tonnage (changes from year ago)	−11.5%	−10.6%	+4.8%
Business Failures (Dun & Bradstreet)	400	340	281
Currency in Circulation (millions)[2]	$32,000[1]	$31,964	$31,566
Dept. Store Sales (changes from year ago)[2]	−7%	−5%	+5%
FINANCE			
Bank Clearings (Dun & Bradstreet, millions)	$28,559	$26,357	$26,655
Federal Gross Debt (billions)	$290.8[1]	$290.6	$291.1
Bond Volume, NYSE (millions)	$39.0	$38.2	$29.2
Stocks Sales, NYSE (thousands of shares)	24,397	21,900	14,075
Loans & Investments (billions, adjusted)[3]	$108.4	$108.8	$102.3
U. S. Govt. Obligations Held (billions)[3]	$30.6	$30.3	$26.7
PRICES			
STEEL's Finished Steel Price Index[4]	247.82	247.82	247.82
STEEL's Nonferrous Metal Price Index[5]	211.6	211.7	234.3
All Commodities[6]	120.0	119.9	119.2
Commodities Other than Farm & Foods[6]	128.1	128.1	128.6

*Dates on request. [1]Preliminary. [2]Federal Reserve Board. [3]Member Banks, Federal Reserve System. [4]1935-39=100. [5]1936-39=100. [6]Bureau of Labor Statistics Index, 1947-49=100.

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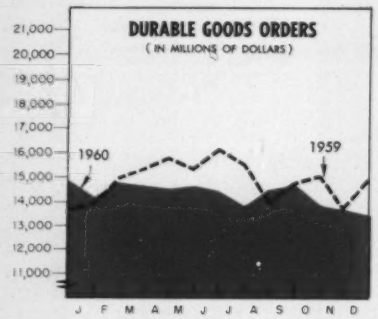
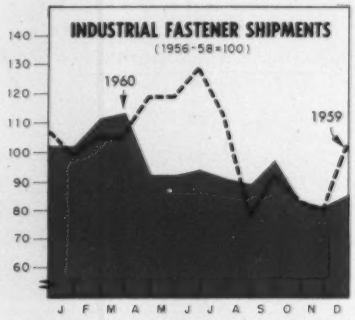
THE BUSINESS TREND



	New Orders*		Sales*	
	1960	1959	1960	1959
Jan.	14,190	13,900	15,450	13,541
Feb.	14,800	14,918	15,670	13,870
Mar.	14,640	15,323	15,170	14,400
Apr.	14,470	15,796	15,000	15,166
May	14,680	15,241	15,060	15,515
June	14,340	16,133	14,880	15,771
July	13,840	15,493	14,730	15,384
Aug.	14,410	13,974	14,420	14,008
Sept.	14,620	14,747	14,410	14,113
Oct.	13,740	15,099	14,080	14,047
Nov.	13,600	13,721	13,810	13,479
Dec.	13,350†	14,770	13,560†	15,010

*Seasonally adjusted. †Preliminary.
U. S. Office of Business Economics.
Charts copyright, 1961, STEEL.



	(Seasonally adjusted)			
	1960	1959	1958*	1957*
Jan.	102	99	133	173
Feb.	111	105	117	177
Mar.	103	105	103	166
Apr.	92	119	102	157
May	92	119	111	168
June	94	129	120	162
July	91	112	133	184
Aug.	89	77	120	155
Sept.	97	92	141	159
Oct.	83	83	137	163
Nov.	81	80	134	147
Dec.	85	102	152	140
Avg	94	101	125	162

*1947-49=100.
Industrial Fasteners Institute.

pected to decline a little during the period. For the week ended Feb. 11, STEEL estimates output will remain at about the 1.5 million ton level.

• **Carloadings Freeze Up** — The weather also gets a large share of the credit (or blame) for the trend in railroad freight carloadings. They have been off considerably since the second week in January because of heavy snow and unusually low temperatures in many of the nation's chief shipping centers. In the first four weeks of 1961, loadings were 19.5 per cent behind the corresponding 1960 period (which was somewhat inflated by the post-steel-strike binge) and 15.5 per cent behind the 1959 pace.

• **Auto Sales Chilled**—The auto industry is still the biggest depressant on STEEL's production index. And a slight gain in production for the week ended Feb. 4 should not be regarded as the first step in a comeback. None is slated for the foreseeable future. Sales have plunged with the thermometer.

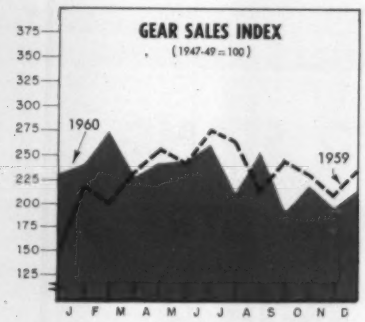
Production of 414,498 passenger cars last month was the lowest total for that month since 1952. It represented only 92.1 per cent of the scheduled level, says *Ward's Automotive Reports*. Only 395,600 units are on schedule for this month, down from the reported goal of 433,600 units only two weeks ago. The first quarter goal has dropped to 1.3 million cars—vs. the 1.4 million announced in the last week of January.

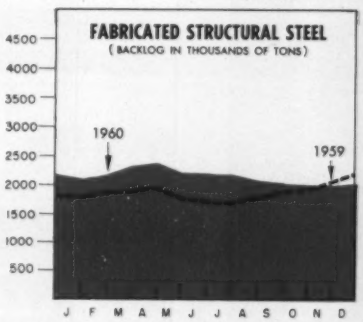
Mass layoffs in motordom within the last week indicate the industry will fall short of the latest schedules. Assuming it reaches 92 per cent of the goal again this month, it would put out only 364,000 cars, the lowest February since 1952.

March easily could follow the same pattern.

The reason is twofold. Sales during January (14,758 a day) were a bitter disappointment. They were well below the year-ago level and only 1 per cent ahead of the recession pace of January, 1958. Contrary to normal experience, sales in the last ten days of the month dipped below the previous ten day level. Producers acknowledge the decline in the general economy as being part of the trouble, but, again, the weather was blamed for keeping potential buyers out of showrooms.

Secondly, inventories have remained above the 1 million unit





	Bookings 1960	Bookings 1959	Shipments 1960	Shipments 1959
Jan.	243.4	218.6	207.3	187.7
Feb.	278.6	199.9	230.2	201.5
Mar.	231.8	234.3	244.6	222.7
Apr.	249.2	255.6	234.8	231.8
May	246.9	241.0	241.3	223.9
June	269.8	274.2	253.6	239.7
July	217.5	262.8	210.8	199.8
Aug.	255.8	213.3	217.3	204.3
Sept.	197.9	213.9	223.5	216.1
Oct.	219.9	230.5	220.6	224.1
Nov.	198.9	208.7	226.7	224.2
Dec.	216.5	233.9	220.0	250.2
Avg	235.5	234.7	227.6	218.8

American Gear Mfrs. Assn.

	Shipments 1960	Shipments 1959	Backlogs 1960	Backlogs 1959
Jan.	209.0	224.3	2,116	1,794
Feb.	240.9	216.1	2,189	1,864
Mar.	277.0	260.5	2,364	1,873
Apr.	286.9	290.6	2,401	1,922
May	284.6	294.1	2,237	1,768
June	332.7	365.4	2,219	1,717
July	301.2	238.6	2,203	1,679
Aug.	331.9	220.4	2,114	1,772
Sept.	323.5	182.6	2,058	1,871
Oct.	313.6	195.3	2,028	1,891
Nov.	288.7	180.8	2,016	2,068
Dec.	246.2	235.7	2,064	2,195
Total	3,436.2	2,904.4		

American Institute of Steel Construction.

mark for several weeks, a level too high to maintain for long if the industry is to remain healthy, maintain many market analysts. At the January sales rate, that represents a 69 day supply. Producers are trying to shave production below the sales pace, but so far they have been unsuccessful.

Dip Is Mild So Far

The outlook for an early upturn was not enhanced with the announcement by the Commerce Department that manufacturers' sales and orders continued to decline in December. The most encouraging aspect of the report was that inventories took another hefty drop, bringing the cutback one month closer to completion. As in most recent months, the biggest declines in both production and new business came in the durable goods industries (see table and graph, Page 84). The biggest exceptions were in the aircraft and electrical machinery industries, which made the best showing for the second consecutive month. Reason: A stepup in defense spending inaugurated in the last days of the Eisenhower administration.

However, economists continue to point out that the current recession is mild by modern standards and promises to remain so in coming months. James Dawson, vice president and economist of the National City Bank of Cleveland, says the drop in industrial production through December (the fifth month of the dip) was only 6.5 per cent compared with a composite of 8.5 per cent in the previous three recessions at a comparable stage. Similarly, personal income was down only 0.15 per cent compared with a composite decline of 1.4 per cent in the first five months of the recessions of 1948-49, 1953-54, and 1957-58. He further observes that if the prior trend were applied to gross national product, it would have been at an annual rate of $495 billion in the last quarter. It was $503 billion, only slightly below the record of $505 billion posted in the third quarter.

"Evidence that the setback has been exceptionally mild to date does not, of course, prove it will continue that way," he hastens to add. "Nevertheless, these trends are encouraging. They lend some support to the theory that this adjustment should be relatively mild because of a comparative lack of excesses in need of correction."

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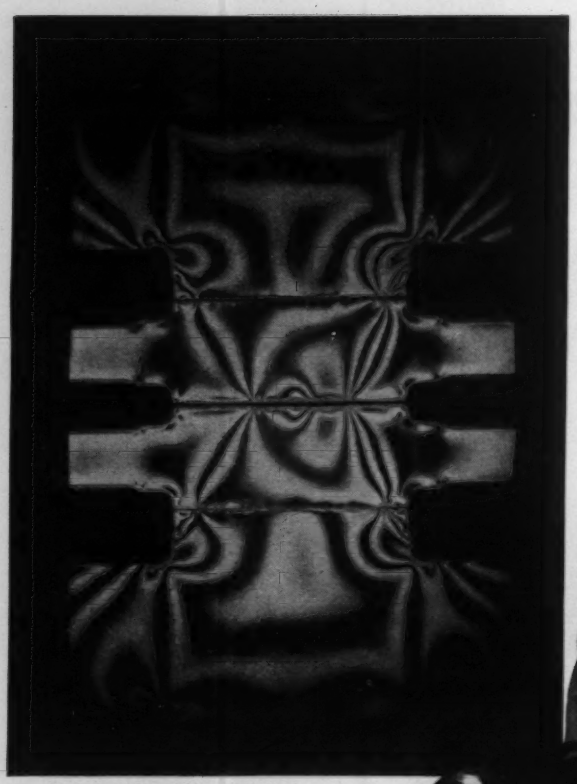

Photo-elastic study of four-high mill showing pressure patterns on roll surfaces.

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. . . and produce fine *Micro Lustre*® finishes

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JAMES L. GAGE
Electric Autolite eng. post

G. R. HARROD
Warner Electric sales mgr.

FREDERICK G. JAICKS
Inland Steel v. p.

Von R. Kaufman was made manager of the Toledo, Ohio, Div. of **Dana Corp.** He replaces **John H. Jones**, appointed assistant to the vice president-manufacturing. Mr. Kaufman was president and general manager of Hayes Steel Products Ltd., Canadian affiliate.

James L. Gage was named chief product engineer at **Electric Autolite Co.'s** new Decatur, Ala., operation, soon to be in production. He was chief engineer, ignition and controls at Autolite's central engineering headquarters in Toledo, Ohio.

John J. McGlone was made vice president-sales of the affiliated Cleveland companies, **Wellman Engineering Co.** and **McDowell Co. Inc.** He was district manager in Chicago for the firms.

William A. Marshall was appointed assistant vice president and manager of manufacturing at **Driver-Harris Co.**, Harrison, N. J. He succeeds **Edward J. Davies**, retired.

James S. Hitchman was made general sales manager, **Rigidized Metals Corp.**, Buffalo.

T. E. Roop was named manager of furnace sales; **James E. Dunn** manager of heat treat sales of **Amsler Morton Co.**, Pittsburgh. **N. M. Pusateri** was made manager of engineering.

Firth Sterling Inc. named **Kenneth E. McKown** Pittsburgh district manager, Carbide Div., to succeed the late **Norman E. Donnelly.**

G. R. Harrod was named general sales manager, responsible for the entire field sales organization of **Warner Electric Brake & Clutch Co.**, Beloit, Wis. He was manager of industrial sales. Reporting to him are new regional sales managers: **John Gibney**, Eastern region, with offices in Madison, N. J.; **Harry Binks**, West Central region (Chicago); **Warner Hamlen**, Western region (Pasadena, Calif.).

Gary W. Keller succeeds **Walter F. Stuker** as purchasing agent of **Taylor Forge & Pipe Works**, Cicero, Ill.

Henry Byrne was named general sales manager of **Raymond F. McHugh & Son**, Philadelphia. He was with Wheelco Instrument Div., Barber-Colman Co.

Cyrus D. Dunthorn, general sales manager, was elected vice president of **Jarl Extrusions Inc.**, East Rochester, N. Y.

Robert M. Terry was elected president and treasurer, **American Refractories & Crucible Corp.**, North Haven, Conn. He replaces **G. T. Hubbell** as president and **R. W. Brown** as treasurer. Both Mr. Hubbell and Mr. Brown have resigned. **Richard L. Matthies** was made secretary.

Andrew F. Gencur was named assistant sales manager, Finished Products Div., **Detroit Stamping Co.**, Detroit.

Billy V. Kerns was made manager of distributor sales at **Link-Belt Co.'s** bearing plant in Indianapolis.

Frederick G. Jaicks was named vice president of **Inland Steel Co.**, Chicago. Former general manager, Indiana Harbor Works, East Chicago, Ind., he continues in that capacity and also assumes duties of **F. M. Rich**, vice president-steel manufacturing, who has resigned. Mr. Jaicks now has the title of vice president-general manager.

Edward A. Scanlon was appointed sales manager, conduit products, **National Supply Div.**, Pittsburgh, Armco Steel Corp. He succeeds **Robert P. Abraham**, appointed Pittsburgh district manager, conduit products, taking over activities previously conducted by M. B. Squires Co.

Robert L. Riley succeeds **Walter R. Penman**, retired, as general manager of **Bethlehem Steel Co.'s** Lebanon, Pa., industrial fasteners plant.

Robert Bruce was made superintendent-blast furnace at the Fairfield, Ala., plant of U. S. Steel Corp.'s **Tennessee Coal & Iron Div.** He is succeeded as blast furnace superintendent at the Ensley, Ala., plant by **Lloyd M. Malone.**

Paul M. Herring was named president of **Kutztown Foundry & Machine Corp.**, Kutztown, Pa. He succeeds his father, **Edgar W. Herring**, resigned.

George L. Wilcox was elected vice president and assistant to the president of **Westinghouse Electric Corp.**, Pittsburgh. He is succeeded as president of **Canadian Westing-**

house Co. Ltd., Hamilton, Ont., by **John D. Campbell.**

G. William Bauer was made technical sales manager, **Stauffer Metals Co.**, Richmond, Calif.

Horace B. Van Dorn was elected vice president-engineering, **Fafnir Bearing Co.**, New Britain, Conn. He is succeeded as director of engineering by **Howell L. Potter.** Mr. Van Dorn succeeds **Fayette Leister,** retired.

Fred R. Sullivan, president of **Monroe Calculating Machine Co.,** division of **Litton Industries,** Beverly Hills, Calif., was elevated to chairman and chief executive officer of Monroe, and named a senior vice president of Litton. **Franklin B. Lincoln Jr.**, assistant secretary of defense in the Eisenhower administration, succeeds Mr. Sullivan as president of Monroe, and was named a vice president of Litton.

Robert E. Widing fills the new post of manager of manufacturing for **Pittsburgh Plate Glass Co.'s** Chemical Div. (formerly Columbia-Southern Chemical Corp.). He has headquarters in Pittsburgh, transferring from the division's Barberton, Ohio, plant where he was assistant works manager.

Walter B. Baisch, vice president-operations, **Michigan Seamless Tube Co.**, South Lyon, Mich., was elected vice president and general manager.

George A. Jones was appointed a vice president of **Colson Corp.**, Chicago. He was general manager of the Jonesboro, Ark., plant, which remains his headquarters.

HENRY A. DENNY CHESTER E. BROWN JOHN H. REDMOND

Koppers vice presidents, general managers

Henry A. Denny was elected vice president-general manager, Engineering & Construction Div., **Koppers Co. Inc.**, Pittsburgh. **Chester E. Brown** was elected vice president-general manager, Tar Products Div. **John H. Redmond** was made vice president-marketing manager in the Tar Products Div. Mr. Denny succeeds **Dr. Walter C. Rueckel,** resigned. Mr. Brown succeeds **Fletcher L. Byrom,** elected president of Koppers last December.

Carl J. Malcolm was made general manager of **Cataphote (Canada) Ltd.**, Brantford, Ont. He was with Canadian General Electric Co. **Keith Cooper,** former superintendent, was made manager at the Brantford, Ont., plant.

Robert McC. Maxwell joined **American Potash & Chemical Corp.,** Los Angeles, as manager of manganese metal sales. He has headquarters in New York, and will direct sales of American Potash's new manganese metal plant. It's under construction at Aberdeen, Miss. Mr. Maxwell was with Jessop Steel Co.

Herbert I. Chambers was made director of engineering for Data Recorders Div. of **Consolidated Electrodynamics Corp.**, Pasadena, Calif.

Marvin L. Billow joined **National Forge Co.**, Irvine, Pa., as marketing manager of special products. He was with Aluminum Extrusions, Charlotte, Mich.

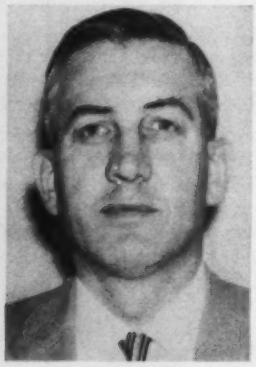
Jack A. Hallinan was made director of engineering for the Kewanee, Ill., plant of **American-Standard Industrial Div.**, American Radiator & Standard Sanitary Corp.

Robert O. Kimmel was appointed Western district sales manager, Microwave Tube Div., **Hughes Aircraft Co.**, Los Angeles.

Ernest N. Robinson was elected a vice president of **Stewart-Warner Corp.**, Chicago. Associated with the company since 1934, for the last

WALTER B. BAISCH

Michigan Seamless Tube exec.



GEORGE A. JONES

Colson vice president

ROBERT McC. MAXWELL

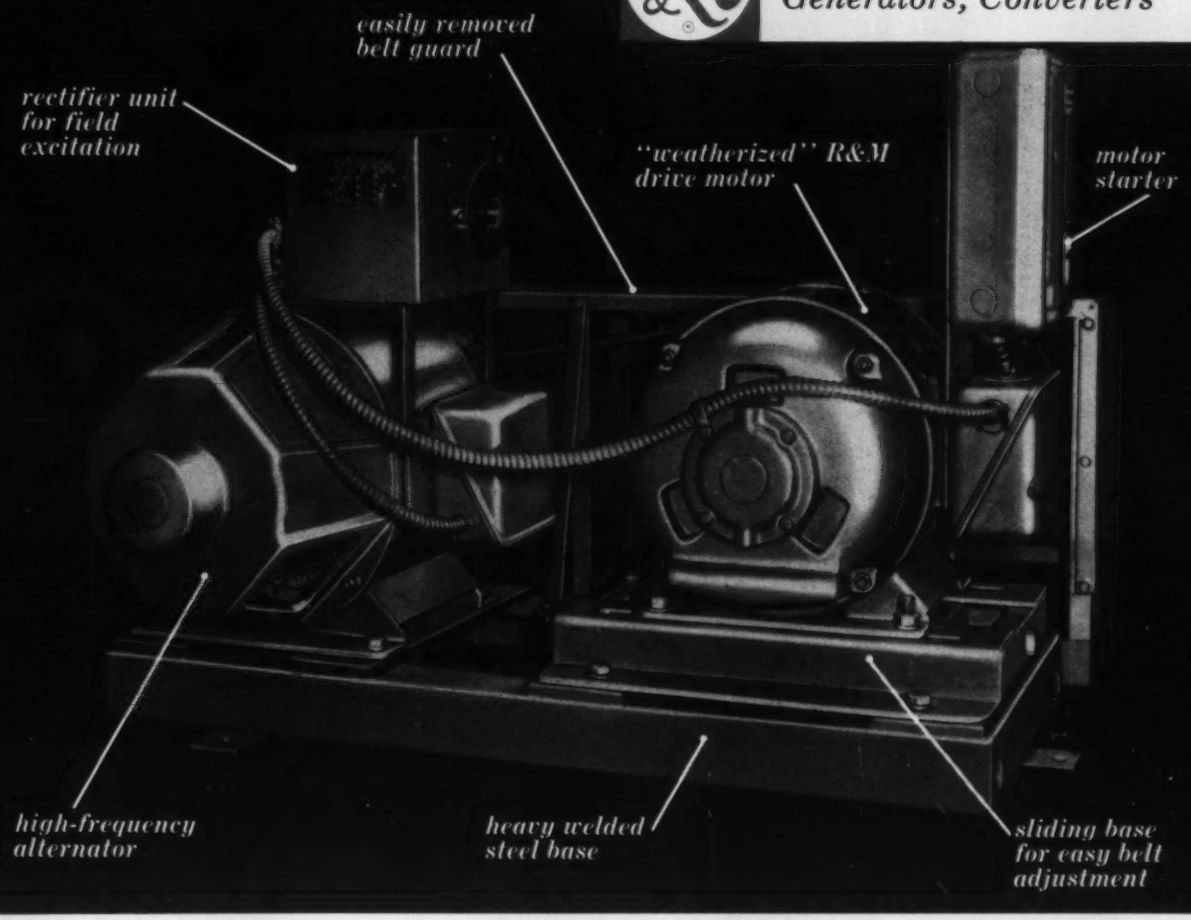
joins American Potash

ERNEST N. ROBINSON

Stewart-Warner v. p.

high frequency

Generators, Converters



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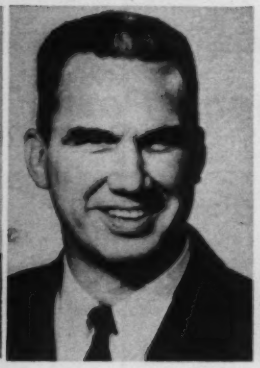
JAMES FRITZ
CF&I metallurgist-Buffalo



W. GORDON JARVIS
Hydreco Div. gen. mgr.

DOUGLAS B. BEATH
Foundry Services div. sales

year he has been general manager of its Alemite & Instrument Div.

James Fritz was appointed Buffalo steel plant metallurgist in the Metallurgical Dept. of **Colorado Fuel & Iron Corp.**

Daniel Lundquist was made assistant sales manager, **Marlin-Rockwell Corp.**, Jamestown, N. Y.

W. Gordon Jarvis was made general manager, **Hydreco Div.**, Kalamazoo, Mich., New York Air Brake Co. He most recently served as manager of manufacturing for the division.

Douglas B. Beath fills the new post of sales manager, Foundry Div., **Foundry Services Inc.**, Cleveland. He was central regional sales manager of the Foseco product line.

Harold B. Smith Jr. was named manager, New Product Divisions, **Illinois Tool Works**, Chicago. He was general sales manager of ITW's Fastex Div., Des Plaines, Ill.

Walter M. Gibbs was named marketing manager of industrial product markets for **Kaiser Aluminum & Chemical Sales Inc.** Prior to his recent assignment as assistant general sales manager, Cleveland, he served as executive assistant to the vice president-marketing at Kaiser Aluminum headquarters in Oakland, Calif.

Richard E. Shaw joins Threadwell Tap & Die Co., Greenfield, Mass., to head its **Cogsdill Drill Engineering Dept.** He was with Union Twist Drill Co.

National Lead Co. made **Emmett A. Torney** sales manager, primary metals, for its Metal Div., with headquarters in New York. He was general sales manager for Bunker Hill Co., San Francisco.

L. R. O'Brien was made manager of the Portland, Oreg., plant of **Union Carbide Metals Co.**, division of Union Carbide Corp. He succeeds **E. L. Hix**, retired.

Maurice M. Botnick was elected vice president-sales, **Silent Hoist & Crane Co. Inc.**, Brooklyn, N. Y. He is succeeded as general sales manager by **James J. Beach Jr.**, former regional sales manager.

M. W. Townsend, vice president-administration, **Handy & Harman**, New York, was elected to the new post of executive vice president.

Jones & Laughlin Steel Corp.'s Stainless & Strip Div., Detroit, named **John J. O'Connor** division manager of production planning. **James P. Eagan** joined the division as metallographer at the Detroit plant.

OBITUARIES...

Roger N. Heald, 64, former president and chairman, **Heald Machine Co.**, Worcester, Mass., died Jan. 25.

John H. Larson, 65, founder and president, **Larson & Ringius Co.**, Chicago, died Jan. 27.

At right: P/M Slitting and Coil-Banding Line in a Chicago steel warehouse service center. →

At left: P/M Cut-to-Length Line in same Chicago Steel Service Center. ←

P/M Lines help make this Steel Warehouse a Service Center

Chicago area warehouse customers get faster service, a better product, as a result of new features built into P/M Cut-to-Length and Slitting and Banding Lines shown here. These lines incorporate special features which, developed through P/M's *productioneering* approach, fit the specific needs of steel service center operation, and increase the speed, accuracy, and economy with which these lines operate. *Productioneering*—designing and building a processing line to the particular needs of the user—makes P/M lines for warehouses simple to operate, easy to maintain, flexible to handle all warehouse requirements. We will be glad to furnish details about the advantages you can get from "productioneered" lines—just write to:

Production Machinery Corporation
MENTOR, OHIO

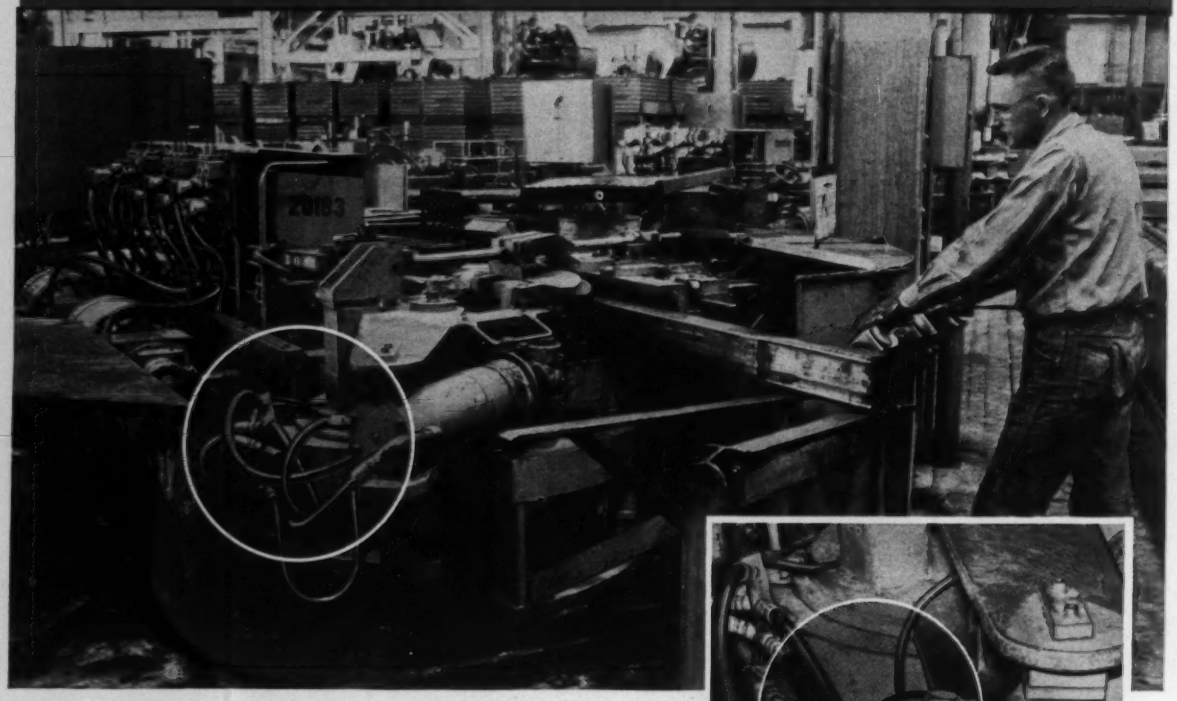
Designers and Builders of Metal Processing Lines and Equipment including: lines for pickling, slitting, shearing and cutting-to-length, grinding, scouring, coil build-up, inspection, and other sheet and strip processing lines and machinery.

P/M ®

AEROQUIP 1508 HIGH PRESSURE SPIRAL WIRE WRAP HOSE

Reduces Maintenance Costs On Hydraulic Bender

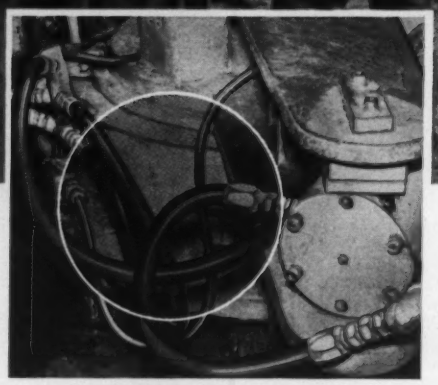
From the job report of a leading plant producing auto frames and stampings



Aeroquip 1508 High Pressure Spiral Wire Wrap Hose and Reusable Fittings provide greater strength and hose flexibility for a leading producer of auto frames. Installed on clamps of hydraulic benders, Aeroquip Hose undergoes constant flexing and pressure surges of 2200-2500 psi. Results? Aeroquip flexibility and strength have prevented hose failures from causing unnecessary maintenance and costly downtime.

Aeroquip Hose and Reusable Fittings help save time, when infrequent hose replacement is required. Hose is cut to length, and the replacement is made right on the job—no special tools are needed. Fittings can be reused again and again.

Your Aeroquip Distributor is a fluid line specialist. He will give you a copy of our Industrial Catalog No. 204 and show why you are in good hands when you consult with Aeroquip. His telephone number is in the "Yellow Pages" under "Hose."



Aeroquip 1508 Hose reduced maintenance on the clamps of these benders for auto frame rails.

Aeroquip is so easy to use—
Your inventory is just a few feet of hose and a handful of fittings.

STANDARDIZE ON Aeroquip

REG TRADEMARK

AEROQUIP CORPORATION, JACKSON, MICHIGAN

INDUSTRIAL DIVISION, VAN WERT, OHIO • WESTERN DIVISION, BURBANK, CALIFORNIA
AEROQUIP (CANADA) LTD., TORONTO 19, ONTARIO
AEROQUIP PRODUCTS ARE FULLY PROTECTED BY PATENTS IN U. S. A. AND ABROAD

Acme Starts Operation of $11 Million Hot Strip Mill

ACME STEEL CO., Chicago, is operating its new, semicontinuous, hot strip mill in Riverdale, Ill. The No. 4 mill converts steel slabs into continuous coils weighing up to 500 lb per inch of width. Improved surface of the product is obtained as a result of greater descaling water pressure available on the mill. Also broader width and thickness ranges offer additional benefits.

The mill meets these growing requirements: Long coils to eliminate manufacturing delays and closer tolerances and uniformity across the width and throughout the length of the coil.

Slabs on the new mill will be rolled into large, continuous coils in 8 to 22¼ in. widths and 0.050 to 0.375 in. thicknesses. Some coils weigh as much as 10,000 lb. In the narrower widths, they will average about 50 in. in diameter; in lighter gages, continuous strips will be ½ mile long. Acme may later widen the mill to produce wider coils.

Auxiliary equipment includes two shear lines, a normalizing furnace, and improved pickling and recoiling facilities.

Main users of Acme's hot rolled strip and sheet steel are makers of automotive parts, farm equipment, building and building hardware specialties. They include customers who are engaged in the production of flat and drawn stampings, welded tubing, cold formed shapes, and other items.

The mill is part of the company's $46 million integration and modernization program (STEEL, Apr. 11, 1960, p. 82) which included the installation (in 1959) of a $35 million melt shop. That facility contains a new steelmaking process which combines continuous hot blast cupolas with top blown oxygen converters. The combination is designed to produce 450,000 tons of ingots a year.

Koppers Co. Expands

Metal Products Div. (Baltimore), Koppers Co. Inc., is expanding its facilities for manufacturing corrugated container machinery. Cost: More than $300,000. The division's Container Machinery Dept. operates plants in Glenarm, Md., and Bordentown, N. J.

West Coast Plant Opened

Keystone-Seneca Wire Cloth Co., a subsidiary of Seneca Wire & Mfg. Co., Fostoria, Ohio, purchased a building at 210 W. Walnut St., Fullerton, Calif. Equipment is being installed in the 44,000 sq ft plant to produce insect wire screening. The plant will be the headquarters for the company's Western Div.

Rolling Mill Modernized

Colorado Fuel & Iron Corp., Denver, has completed an extensive modernization of the 14 in. rolling mill at its Pueblo, Colo., plant. The mill's finishing stand has been equipped with a new motor. The installation of pull-over "dogs," power roller lines, and electronic bar turners will improve transfer of bars between the mill's stands. Utilization of spare housings, complete with installed rolls, will make for easier, faster section changings.

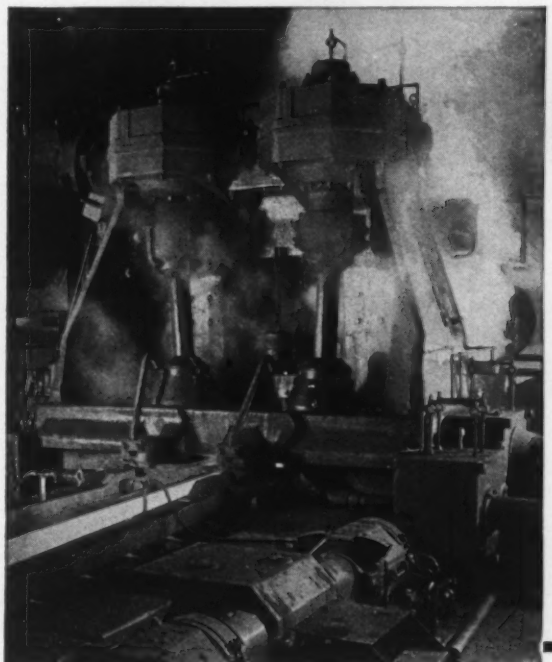
Detroit Steel Buys Mill

Detroit Steel Corp., Detroit, has awarded a contract to E. W. Bliss Co., Canton, Ohio, for a 22½ in. and 53 in. by 56 in., four high, temper mill with auxiliaries and coil conveying equipment. Cost: More than $1 million. George Perrault is vice president in charge of the Bliss Rolling Mill Div. at Salem, Ohio.

Pittsburgh Plant Improved

Firth Sterling Inc., Pittsburgh, has launched a substantial capital expenditure program for the purpose of modernization and cost reduction. The program includes installation of

(*Please turn to Page* 96)



Edging hot strip steel

No place for second-best equipment. That's why this heavy-duty vertical overdrive edger uses rugged Cone-Drive **double-enveloping worm** gearing to drive the vertical rolls continuously.

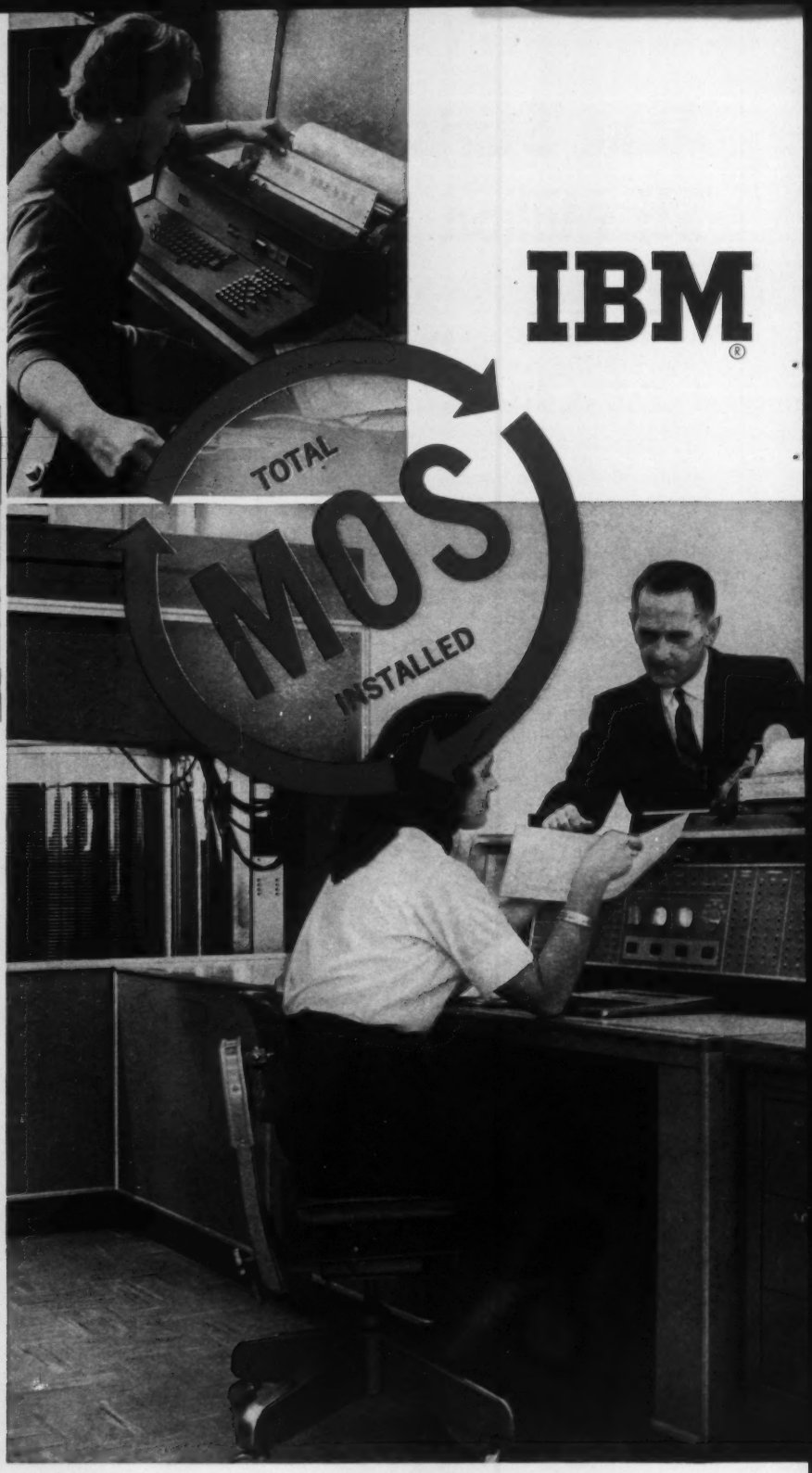
Rugged Cone-Drive gearing is available in gearsets, speed reducers and gearmotors.

CONE-DRIVE GEARS

DIVISION MICHIGAN TOOL CO.
7171 E. McNichols Rd., Detroit 12

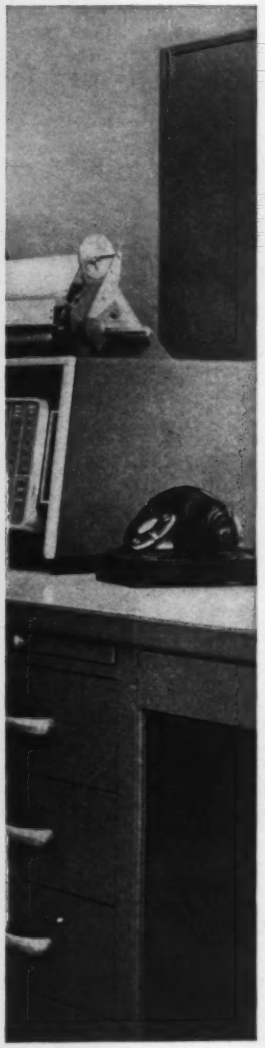
Remote unit reports progress
Located in the Sales Department, this remote inquiry station has a direct line to the RAMAC unit on the floor below. When a customer order number is keyed into this station, an up-to-date status report is *immediately* printed out on the automatic typewriter.

Keeps an eye on production
Final assembly and testing of these Cramer timing controls are typical of the many precision operations carried on in the plant. Each involves a large number of small parts which are produced, stocked and assembled under MOS control.



Gets information fast—Mr. J. T. Kennedy, Treasurer, checks with operator of the IBM RAMAC 305 Data Processing System—the heart of Cramer's Management Operating System. Disk file at rear stores and continually updates all operating records—each immediately available on demand.

Management Operating System at Cramer Controls Corporation



...improves delivery and reduces inventory ...with an increase in sales of 60%

Cramer Controls Corporation, Centerbrook, Connecticut, manufactures precision timers and control instruments. They consider their IBM Management Operating System a *highly profitable investment.*

To this progressive company, with 330 employees and annual sales of around $4 million, IBM data processing is an essential part of management control. It has helped them cut costs...reduce inventories... improve profit margins...speed customer service. And it has done all this while handling a 60 per cent increase in sales and reducing delivery time by five full days.

Built around the IBM RAMAC® 305, the system at Cramer uses modern data processing techniques to *inter-relate* the six major control functions: Sales Forecasting, Materials Planning, Inventory Management, Plant Scheduling, Work Dispatching & Operations Evaluation.

How MOS works to cut costs

Complete data for each major operating function is stored in your data processing system. There, past and present sales trends and forecasts are combined to produce a more complete "finished product" plan which automatically...

- determines material requirements
- checks these requirements against inventories
- allocates stocks to assembly needs
- polices inventories for under- or over-stocked items
- initiates stock-replenishing orders as needed

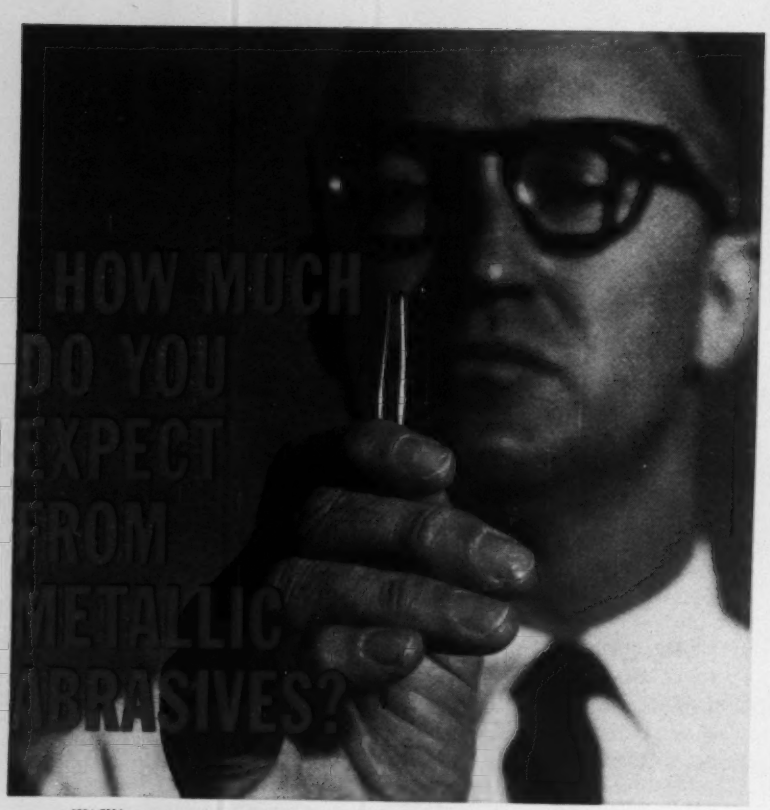
The sequence continues through scheduling, dispatching and operations evaluation. Continually updated cost and performance figures keep management informed of every phase of production.

Any change entered into the system is automatically reflected in all other control data. The compensation is made according to a prearranged plan—*your* plan—so that all controls are working toward your *current* objectives.

MOS offers comprehensive control

Only with the total approach provided by MOS can you get such coordinated effort, such complete information, such tight operational control. Only with MOS can you study, *in advance* the effect of decisions yet to be made. For more information, call your local IBM office.

IBM® DATA PROCESSING



3334-CMA

. . . maybe not enough!

But don't be half-sure. Call your CMA Counselman for all the facts. He can help you uncover new efficiencies, new applications, new areas where metallic abrasive blasting equipment can be used to your greater advantage.

The CMA Counselman is a technological service extension of CMA's research, development, manufacturing facilities and experience in producing iron and steel abrasive shot and grit.

Your call to CMA will bring a Counselman who is a specialist to your industry — specifically steel mills, foundries, enameling plants, and forge shops. As a specialist, your Counselman is industry-oriented; he is a qualified consultant in subjects of metallurgy, engineering, and production; he makes available to you assistance in selecting equipment and components, advising techniques, specifying materials.

For immediate information and service, phone Cleveland, HEnderson 1-0900, or write.

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(*Concluded from Page 93*)

a continuous, controlled atmosphere, annealing furnace; installation of an 18 in. cogging mill; renovation of the 12 in. mill; and modification of a 10 in. rolling mill so that both 10 in. mills can produce similar rolled products. Substantial additions are being made to tungsten powder producing facilities in the Carbide Div.

Abrasive Plant Enlarged

Cleveland Metal Abrasive Co., Cleveland, has completed expansion of its plant in that city. The project included installation of automated, electronically controlled equipment and enlargement of its laboratory facilities. The firm makes iron and steel abrasive shot and grit.

Stamping Plant to Close

American Flange & Mfg. Co. has closed its stamping plant at Niles, Ohio, and is moving to Linden, N. J. The move is being made for competitive reasons, officials say.

Olive Can Co. Sold

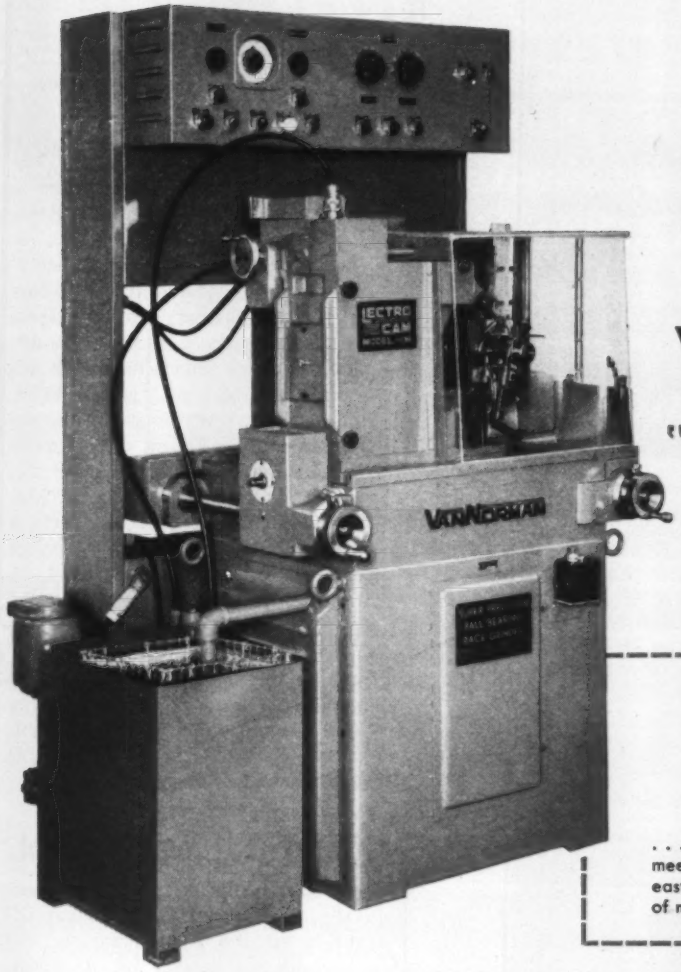
Caspers Tin Plate Co., Chicago, has sold all of the operating assets of its wholly owned subsidiary, Olive Can Co. The new corporation, Olive Can Co., is completely unrelated to Caspers Tin Plate Co.; it makes plain tin and lithographed specialty cans. Owners of the new company are Albert and Philip Armato.

A-C Renames Department

Allis-Chalmers Mfg. Co., Milwaukee, changed the name of its Pump & Compressor Dept. to Fluid Dynamics Dept. E. F. Greiwe is manager of the department.

Forms Canadian Company

Wheelabrator Corp., Mishawaka, Ind., organized Wheelabrator Corp. of Canada Ltd. as successor to the Canadian Div. of the parent firm. The Canadian firm supplies airless blast cleaning equipment, abrasives, and dust and fume collection systems from its plant in Scarborough, Ont. It also has an office in Montreal, Que. Officers of the new corpora-



NEW MACHINE SPOTLIGHTS VAN NORMAN POLICY OF "INDUSTRY-INTEGRATED DESIGN"

One of the biggest draws at the MACHINE TOOL BUILDERS' EXPOSITION

All-New VAN NORMAN MINIATURE BEARING GRINDER

. . . plunge-cut radius grinder specifically designed to meet the requirements of the bearing industry for fast, easy, precision grinding of ball grooves on inner races of miniature bearings.

Production Benefits Most-Wanted by Each Industry Supplied by Machines Engineered to the Industry's Specific Requirements.

Van Norman "Industry-Integrated Design"— as typified by the new Model-1M Lectro-Cam Miniature Bearing Grinder—offers every industry the machines it needs for higher production, finer precision and greater savings. This broad Van Norman program is based on your own specific requirements, engineered with Van Norman know-how and skill into production tools that do the best job for *you*.

Widely versatile Van Norman engineers will work with you, and with your men at the management, engineering and production levels. You'll find that Van Norman Machine specialists speak your language. Their preferred approach to any particular machining problem is one of close cooperation with the responsible people at every stage of the design and development of a new machine tool. Your own ideas and suggestions are carefully studied, and ways are sought to incorporate them as solid benefits through sound Van Norman design principles accumulated during more than six decades.

Whatever your machine requirements, you will get all-round efficiency through Van Norman "Industry-Integrated Design." Let us know your needs. Contact Van Norman Factory or Van Norman Local Machine Tool Distributor. 2608

VAN NORMAN MACHINE COMPANY

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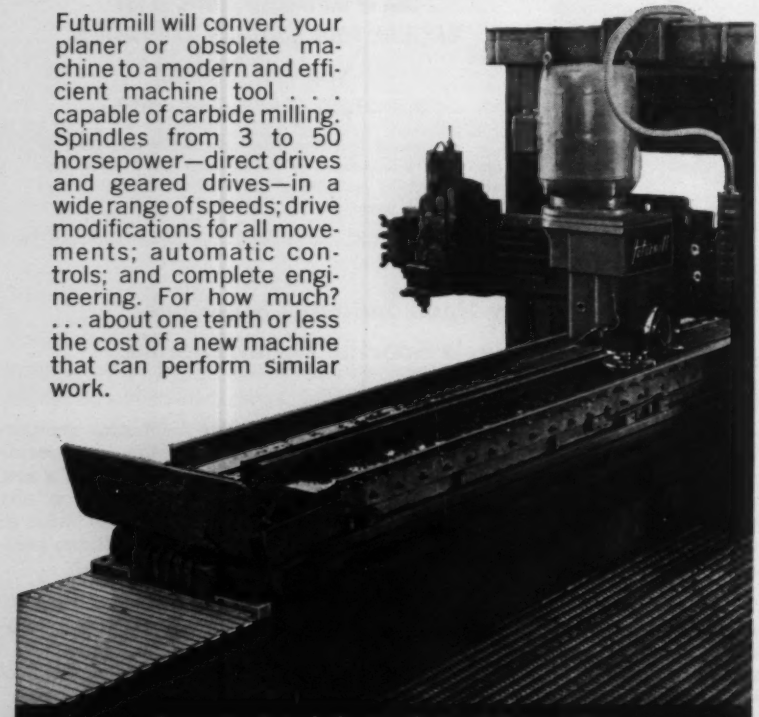
MACHINES THAT PRODUCE PROFIT . . .

Seventy Futurmill planer conversions remove more metal per hour than **Seven Hundred** unconverted planers of the same size and make

One company reports that a job previously estimated at thirty-three hours planing time per piece was reduced to four hours actual machine time per piece with their Futurmill conversion. The savings derived from the one job of 120 pieces more than paid the entire cost of converting the planer. Others report equally substantial savings in time; greater production capacity for one machine; and the discovery of many new applications for converted machines.

Futurmill will convert your planer or obsolete machine to a modern and efficient machine tool . . . capable of carbide milling. Spindles from 3 to 50 horsepower—direct drives and geared drives—in a wide range of speeds; drive modifications for all movements; automatic controls; and complete engineering. For how much? . . . about one tenth or less the cost of a new machine that can perform similar work.



For complete information—call or write:

Futurmill inc.

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tion are: President, H. M. Miller; vice president and general manager, R. A. Campbell; vice president, J. A. Schmidt Jr.; secretary and treasurer, E. T. Sullivan; and controller, J. E. Donlan. J. D. Lamb is general sales manager.

Undertakes Titanium Study

The Air Force has awarded a $176,000 contract to Republic Aviation Corp., Farmingdale, N. Y., for the development of titanium extrusion processes. The contract also covers phases of a study into techniques for handling the high strength, difficult to shape metals needed in advanced aircraft and space vehicles. The current study is under the direction of T. S. Felker, project monitor in the Manufacturing & Materials Technology Div., Air Materiel Command, Wright-Patterson AFB, and Gunther Pfanner, project engineer for Republic.

Voss Engineering Expands

Voss Engineering Co., Pittsburgh, expanded its roll manufacturing and reconditioning facilities at Wilmerding, Pa. W. L. Van Winkle is sales manager of the division.

GE Expands Computer Dept.

General Electric Co., Schenectady, N. Y., plans a $4 million addition to the manufacturing and headquarters facility of its Computer Dept. at Phoenix, Ariz. About 190,000 sq ft will be added to the 204,000 sq ft manufacturing and administrative building. Bids for the new building will be called in March, with construction scheduled to begin in April.

The Computer Dept. also plans to construct a $1.5 million computer development and research laboratory at Sunnyvale, Calif. Clair C. Lasher is general manager of the department.

Industrial process control computer business has been transferred from the Computer Dept. to GE's Industrial Control Dept. The department manufactures automatic control equipment for process industries, including steel.

GE also plans to weld into one organization (Systems Sales & Engineering Operation) all its market development and advanced engineer-

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(CARBON-GRAPHITE)

THE VERSATILE ENGINEERING MATERIAL THAT POSSESSES MANY UNIQUE AND PRACTICAL ADVANTAGES FOR A VARIETY OF APPLICATIONS

MINIMUM LUBRICATION REQUIRED—Because of the controlled porosity and non-melting nature of GRAPHITAR, the only lubricant GRAPHITAR bearings need is water or other low-viscosity fluid. Any such fluid with non-gumming characteristics will provide an extremely low coefficient of friction and assure long life of the GRAPHITAR parts.

RESISTANCE TO CHEMICAL ATTACK—GRAPHITAR has the ability to withstand the action of almost any chemical, with the exception of the most highly oxidizing re-agents in hot and concentrated form. GRAPHITAR parts, for example, operate efficiently in steam, chemical and gas valves to provide a corrosion resistant material operating under the most adverse conditions.

MECHANICALLY STRONG – GRAPHITAR will not warp or distort even in high pressure applications. Compressive strength up to 45,000 psi and transverse breaking strength from 3000 to 16,000 psi, depending on the grade.

HEAT RESISTANT—GRAPHITAR is not affected by heat under neutral or reducing conditions. Temperatures of oxidation for most grades is approximately 700 degrees F. In addition, GRAPHITAR engineers have developed a special oxidation resistant grade of GRAPHITAR that has been exposed in an oxidizing atmosphere (air) of 1200 degrees F. and after 200 hours, it showed a weight loss of less than six per cent.

MOLDABLE—GRAPHITAR has excellent moldability properties that make possible and practical unusual shaped parts. Design requirements such as ears, face slots, and outside diameter notches can easily be incorporated into GRAPHITAR parts without secondary machining and finishing operations.

MACHINING—The United States Graphite Company operates an excellent finishing department to do all finishing operations to the most exacting specifications. GRAPHITAR may be ground to size or shaped with a tungsten carbide or diamond tipped tool to tolerances as close as .0005". When surfaces require a high degree of precision in flatness, lapping and polishing equipment are employed and accuracies within three light bands can be produced.

LIGHT WEIGHT— GRAPHITAR is lighter than magnesium and is being employed increasingly in the aircraft and missile fields. The weight per unit volume of various GRAPHITAR grades is as follows: 102.8 to 116.03 pounds per cubic foot, .0595 to .0672 pounds per cubic inch, .952 to 1.074 ounces per cubic inch.

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R-284-1

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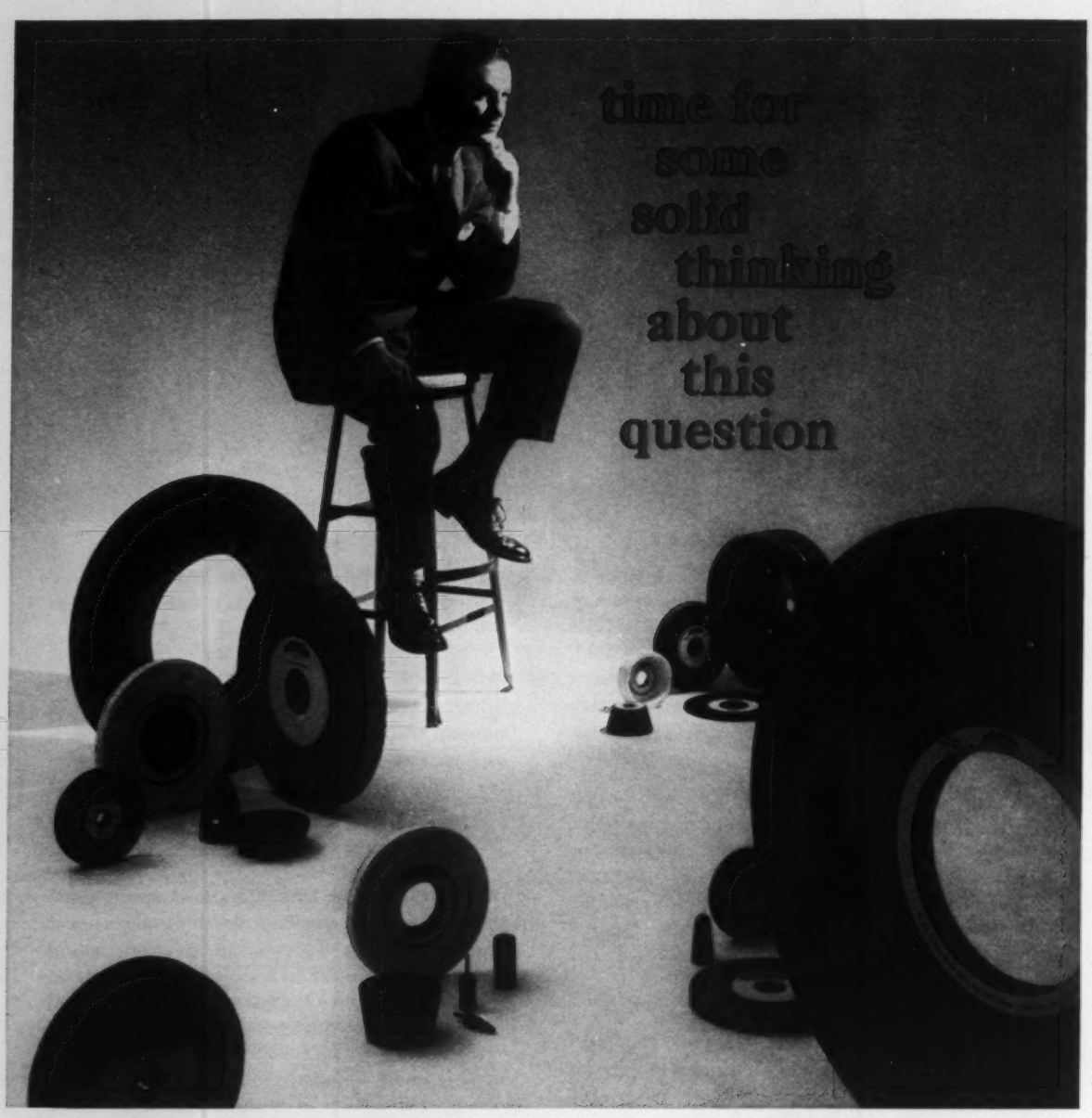
GRAPHITAR® CARBON-GRAPHITE • GRAMIX® POWDER METALLURGY • MEXICAN® GRAPHITE PRODUCTS • USG® BRUSHES



Are *you* getting the most profitable ratio between grinding costs and production? The key is efficient grinding wheel performance . . . and with Simonds Wheels you get it. Complete line has grinding wheels of every grain and grade combination . . . expertly-engineered products, thoroughly tested, readily available . . . and, in specifications now proving their cost-saving efficiency. New illustrated catalog provides complete information. Write for copy on your letterhead.

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Your "buy-law" for better grinding
CALL YOUR SIMONDS DISTRIBUTOR
helping YOUR business is HIS business

WEST COAST PLANT: EL MONTE, CALIF. — BRANCHES: CHICAGO • DETROIT • LOS ANGELES • PHILADELPHIA • PORTLAND, ORE. • SAN FRANCISCO SHREVEPORT — IN CANADA: GRINDING WHEELS DIVISION, SIMONDS CANADA SAW CO., LTD., BROCKVILLE, ONTARIO • ABRASIVE PLANT, ARVIDA, QUEBEC

ing activities for the automation of industrial processes. It will be headquartered in Schenectady, N. Y., and will be headed by G. W. Knapp as manager.

ASSOCIATIONS

America Zinc Institute, New York, moved its Detroit headquarters to 638 New Center Bldg., Detroit 2, Mich. James E. Zane, market development engineer, continues to be in charge of the expanded facilities.

R. Lewis Stubbs has been appointed director-general of the **Lead Development Association** and the **Zinc Development Association,** London, England. Each association continues to function separately.

Tool & Die Institute, Chicago, elected these officers: President, Charles Zapf, Chas. Zapf & Co., Evanston, Ill.; vice president, Paul Prikos, Prikos & Becker Tool Co., Skokie, Ill.; and treasurer, James Coduti, Hudson Tool & Die Co., Chicago.

E. J. Flickinger, Indiana Cap & Set Screw Co., Franklin Park, Ill., has been elected vice president of the **Chicago Bolt, Nut & Screw Association.**

Chicago Association of Spring Manufacturers elected these officers: President, R. G. Lambrecht, Automatic Spring Coiling Co.; vice president, E. J. Dudek, Wm. Dudek Mfg. Co.; and secretary-treasurer, W. K. Schuch, Associated Spring Corp. Headquarters of Associated Spring are in Bristol, Conn.

NEW ADDRESSES

U. S. Steel Corp., Pittsburgh, is moving the administrative headquarters of **U. S. Steel Homes Div.** to New Albany, Ind. The move will be completed by June 1.

Raytheon Co. is opening its new headquarters in Lexington, Mass., this month. The 137,000 sq ft structure is the first at Raytheon

(*Please turn to Page* 104)

LESS LINER, MORE COATING, BETTER PROTECTION, LONGER WEAR . . . NORTH PVC GLOVES

These features, combined with better fit, more comfort, greater dexterity, and maximum resistance to chemicals, oils, greases, etc., mean lower coated glove costs, higher worker output.

For outstanding hand-to-shoulder protection with an uncoated material, insist on Jomac terry cloth gloves, hand guards, pads, mitts and safety sleeves. The loop-pile fabric is long-lasting, cut, abrasion and heat-resistant—and washable.

To keep dry, comfortable and safe in foul weather, insist on North PVC Wet-Weather Clothing . . . tough, flexible, nonaging, waterproof, resistant to abrasion and most oils, greases and chemicals. Available in high-visibility safety yellow.

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JOMAC

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"JOMAC Sells Quality . . . and Quality Sells JOMAC!"

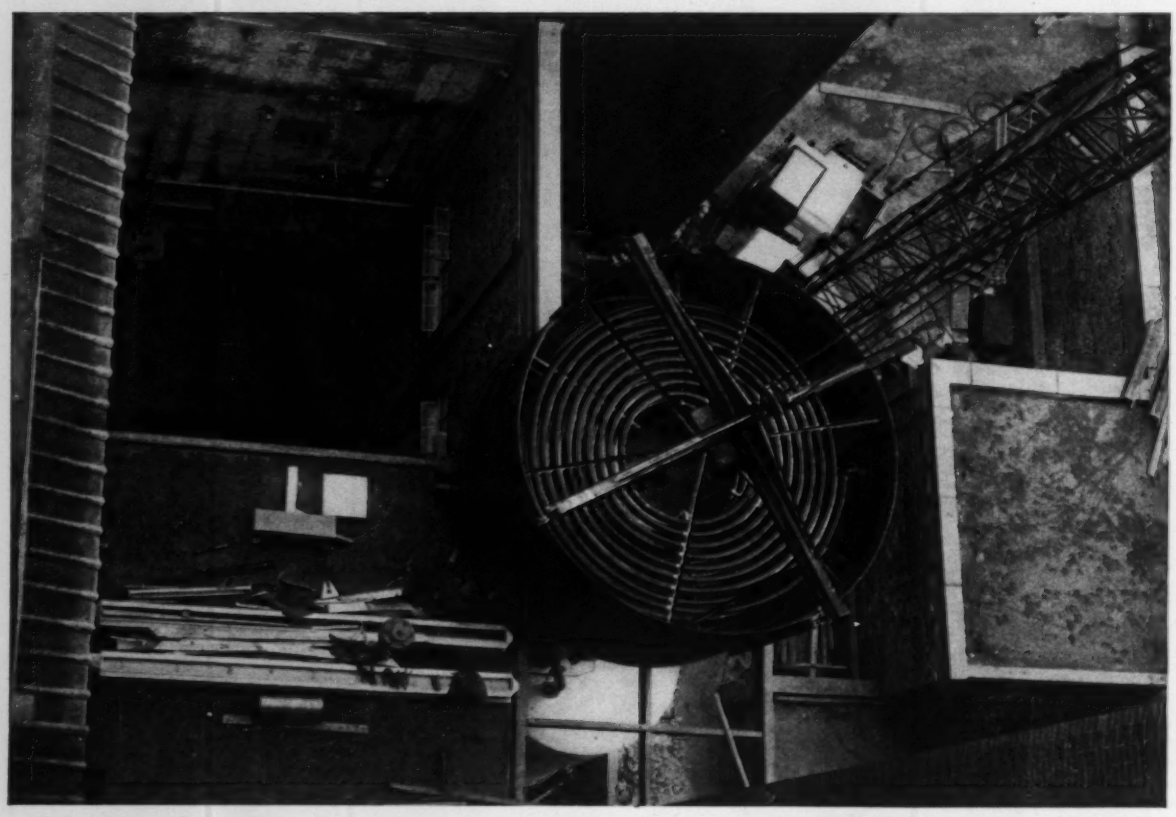
Seagram's "to be sure" for its new

REVERE COPPER
Plate and Tube fabricated by
Matt Corcoran & Company
into whiskey refinement
distillation unit for
Joseph E. Seagram & Sons, Inc.

On these pages, you see what is known in distilling as a "doubler". Doubling is further distillation of beverage spirits in a "doubler" or copper kettle to acquire an additional degree of refinement. Coupled with a larger capacity, this doubler offers a distinct advantage—a larger distillation cycle resulting in a greater uniformity of product. These are some of the reasons for the consistently fine quality of Seagram products.

This doubler was fabricated in three sections which were transported on flat-bed trucks from the copper-smithing plant of Matt Corcoran & Company, Industrial Boulevard in Louisville, Kentucky to the port of shipping at Aurora, Ind. From there, they were trucked to the Joseph E. Seagram & Sons, Inc. Distillery at Lawrenceburg, Indiana.

In order to install the doubler it was necessary to remove the roof from a distillery building. Once in the building, the



used REVERE COPPER "Doubler"...

three sections were welded together, and the roof was replaced.

Revere Copper was selected for the doubler because the inherent characteristics of man's oldest metal have proved superior in distilling fine whiskey. It does not react with alcohol and a wide variety of other liquids and gases.

And, as to the advantages of working with copper, Matt Corcoran & Company, who has been working with this metal for over a half century has this to say, "Copper is extremely easy to work into any desired shape or design, it conducts heat quicker and with greater uniformity than any other commercial metal, and is quickly and economically welded by modern methods. This latter characteristic of copper was particularly important in the Seagram installation. In this case the three-section doubler had to be welded together under conditions where there was barely room for a man to get between the sides of the vessel and the walls of the building in which it was installed."

And, it was because of these same superior characteristics that copper was used in the interior of the doubler in the form of Revere Copper Tube . . . 1,000′ of 4″ O.D.

It is jobs such as this doubler that have given Revere the background of experience that can prove valuable in the solution of your particular metals problem . . . whether it involves copper, brass, aluminum, or any one of their alloys.

REVERE

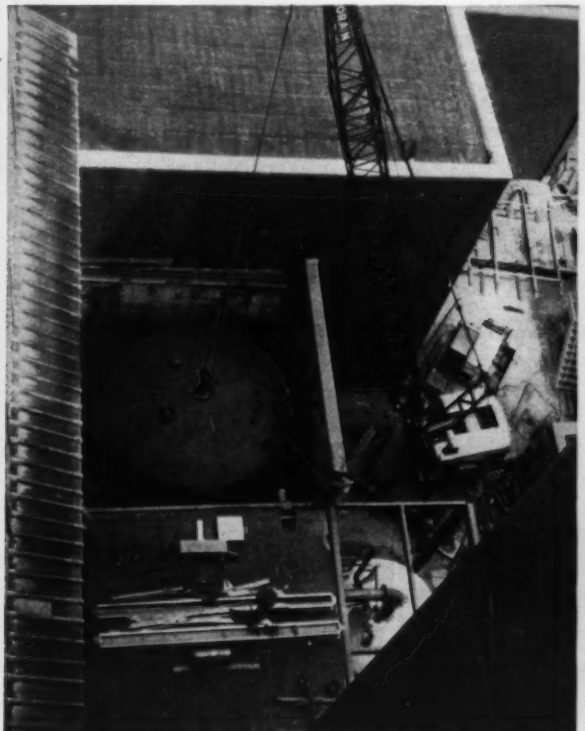
COPPER AND BRASS INCORPORATED

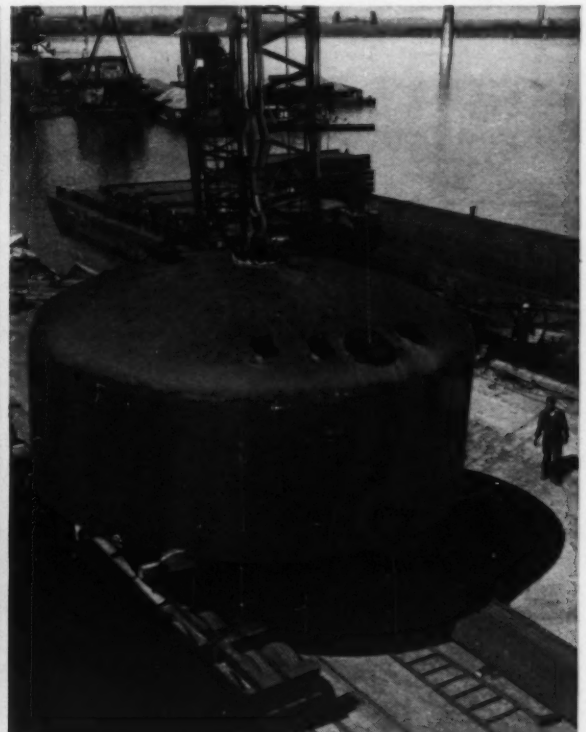
Founded by Paul Revere in 1801

230 Park Avenue, New York 17, N. Y.

Sales Offices in Principal Cities, Mills: Rome, N. Y.; Baltimore, Md.; Chicago and Clinton, Ill.; Detroit, Mich.; Los Angeles, Riverside and Santa Ana, Calif.; New Bedford and Plymouth, Mass.; Brooklyn, N. Y.; Newport, Ark.; Ft. Calhoun, Neb.

Distributors Everywhere.





(left)—**LOWERING BOTTOM SECTION** of the doubler into position. *(above)*—**TOP SECTION OF DOUBLER** is fitted into place. You can readily see why it was necessary to remove roof prior to installation. *(above right)*—**TOP SECTION OF DOUBLER** being removed from flat-bed truck and placed aboard barge preparatory to trip to Aurora, Indiana, from where the three sections were trucked to the Joseph E. Seagram & Sons, Inc., Distillery at Lawrenceburg, Indiana.

JF SERIES

EASY SAFE EFFICIENT LIFTING!

IT'S EASY to raise or lower loads while pulling a trolley mounted Coffing Quik-Lift Electric Hoist. The pistol-grip control station and the combination strain cable and control cord makes this possible. The light but strong aluminum housing provides ease of portability. Changing voltages, limit switch, type of suspension or chain is quick because the housing is in sections.

FOR SAFETY the control station is made of non-conducting plastic in which the voltage is reduced to 115 volts and the push-buttons are interlocked. The V-type brake which provides maximum braking surface and positive control of loads is another safety measure.

FOR EFFICIENCY this hoist has been designed to bring heavy-duty performance plus durability to the portable hoist field. It will pay you to specify Coffing Quik-Lift. Twenty models—capacities range from ¼ to 2 tons. Ask your distributor for details or write for Bulletin ADH-65.

COFFING HOISTS

DUFF-NORTON COMPANY

Four Gateway Center · Pittsburgh 22, Pa.

COFFING HOISTS

Ratchet Lever • Air
Hand Chain • Electric

DUFF-NORTON

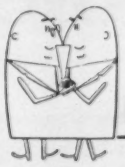
DUFF-NORTON JACKS

Ratchet • Screw
Hydraulic • Worm Gear

(*Concluded from Page* 101)

Center where the firm expects to erect other office and research facilities.

Wm. A. Holmin Corp. moved to 1325 Seventh St., Rockford, Ill. The new plant represents an increase of more than 300 per cent in area.



CONSOLIDATIONS

Merger of **Bridgeport Brass Co.**, Bridgeport, Conn., into **National Distillers & Chemical Corp.**, New York, has been approved by directors of the firms. The proposal will be submitted to stockholders in May. Austin R. Zender would continue president of Bridgeport Brass and would become a director of National and chairman of its executive committee.

General American Transportation Corp., Chicago, acquired **Infilco Inc.**, Tucson, Ariz., producer of water and waste equipment. The Tucson firm will be operated as part of the Fuller Group of General American.

Pettingell Machine Co., Lakeport, N. H., has been acquired as a subsidiary by **Browning Laboratories Inc.**, Laconia, N. H. Pettingell makes sheet metalworking machinery.

Consolidated Aluminum Corp., Jackson, Tenn., acquired **AIAG Metals Inc.**, New York. The Tennessee firm is a producer of aluminum foil, coiled sheet, and superpurity aluminum. Through its new subsidiary, Consolidated becomes distributor for ultrahigh purity gallium and aluminum produced by processes of Aluminum Industrie A.G. of Switzerland.

Tubular Micrometer Co., St. James, Minn., and **George Scherr Co. Inc.** have merged. The corporate name has been changed to Scherr-Tumico Inc., St. James. Officers of the integrated enterprise include: President, H. M. Jones; vice president and treasurer, LeRoy T. Smith; vice president and general sales manager, R. V. Anderson; secretary, M. A. Erickson; and assistant secretary, E. A. Yeadicke.

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4-HIGH 2-STAND TANDEM TEMPER PASS MILL

UNITED

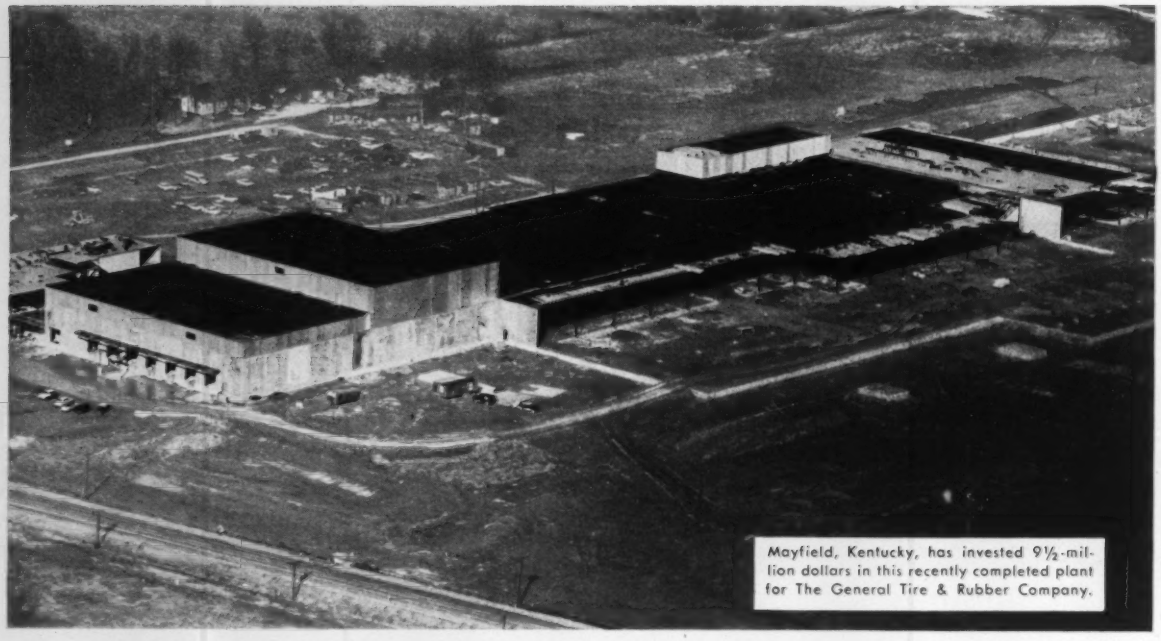
ENGINEERING AND FOUNDRY COMPANY

PITTSBURGH, PENNSYLVANIA

Plants at Pittsburgh, Vandergrift, Youngstown, Canton, Wilmington

SUBSIDIARIES: Adamson United Company, Akron, Ohio
Stedman Foundry and Machine Co., Inc., Aurora, Indiana

Designer and Builders of Ferrous and Nonferrous Rolling Mills, Mill Rolls, Auxiliary Mill and Processing Equipment, Presses and other heavy machinery. Manufacturers of Iron, Nodular Iron and Steel Castings and Weldments.



Mayfield, Kentucky, has invested 9½-million dollars in this recently completed plant for The General Tire & Rubber Company.

KENTUCKY offers more industrial FINANCING PLANS than any other state!

THANKS partly to Kentucky's natural advantages, and partly to its *unique* combination of new-plant financing plans to supplement the usual commercial financing, more great and successful companies are now negotiating or building new plants in this fast-growing State than ever before in history.

A $9,500,000 plant has just been built in Mayfield, Kentucky, for The General Tire & Rubber Company – financed through the issuance of industrial revenue bonds. Other large new plants have similarly been built or are now building in Danville, Franklin, Eminence, Lebanon, and Bowling Green, for Genesco, Inc., Potter & Brumfield Division of American Machine & Foundry Company, Red Head Division of Brunswick Corporation, Swift and Company, and Bowling Green Manufacturing Company, subsidiary of Holley Carburetor Company.

And, just this year, Kentucky has created two additional sources of industrial financing (one from public funds and one from private funds) which now give Kentucky an unmatched "complete line" of different financing plans:

1. **Industrial Development Finance Authority:** The 1960 General Assembly, for the first time, appropriated funds which can be loaned to local non-profit industrial development agencies to finance industrial subdivisions and plants.
2. **Business Development Corporation:** This is a company organized to make loans to new industries or to existing industries for expansion. It is privately managed and is privately financed by banks, insurance companies, utility and transportation companies, and other private corporations interested in Kentucky's economic expansion. Most Kentucky financial institutions have already subscribed to its stock and lending funds.

Would your company like to consider the advantages of financing a Kentucky operation? We would feel privileged to send you full details and recommendations. Your inquiry will be held in strictest confidence. *Address:*

Lieutenant Governor Wilson W. Wyatt, or
E. B. Kennedy, *Commissioner,*
Department of Economic Development
800 State Capitol Building, Frankfort, Kentucky

COMMONWEALTH OF
KENTUCKY
WHERE BIG THINGS ARE HAPPENING

FIBER METAL PROGRESS— A new technique employing fiber metal inserts improves spot, seam, and projection welding, and brazing, says Armour Research Foundation of Illinois Institute of Technology, Chicago. Placed between joining surfaces, the fibers melt first allowing contacting surfaces to melt before bulk metal. In brazing, fiber inserts are glycerin soaked and infused with brazing metal. Advantages: Greater efficiency, lower power; the technique works with relaxed fitup requirements, produces less electrode indentation. Potential: Resistance welds in copper; higher remelting temperatures in joints between tungsten, molybdenum, columbium.

THERMOELECTRIC BEACON— Within five years, thermoelectric devices may replace present power systems on light buoys which mark ocean lanes, predicts Dr. W. B. Green, Semiconductor Dept., Westinghouse Electric Corp., Pittsburgh. Present operating costs run about $8 per kilowatt hour. Engineers hope to trim that to about $1.50 with thermoelectricity.

SOUND GRINDING— Second phase of a research project on ultrasonic grinding just completed for the Air Materiel Command has turned up this fact: In grinding supermetals conventionally, locally produced high temperatures produce a loading effect that interferes with grinding wheel efficiency. Ultrasonics limits wheel loading for freer cutting. Sheffield Corp., Dayton, Ohio, found that it's more efficient to energize the spindle than the workpiece.

EARTH-BOUND JET— A new type turbine powered by a jet engine is pumping 600 million cu ft of natural gas daily through a pipeline compressor station at Possum Trot, Ky. The turbine utilizes the exhaust thrust of a Pratt & Whitney jet, says Columbia Gulf Transmission Co.

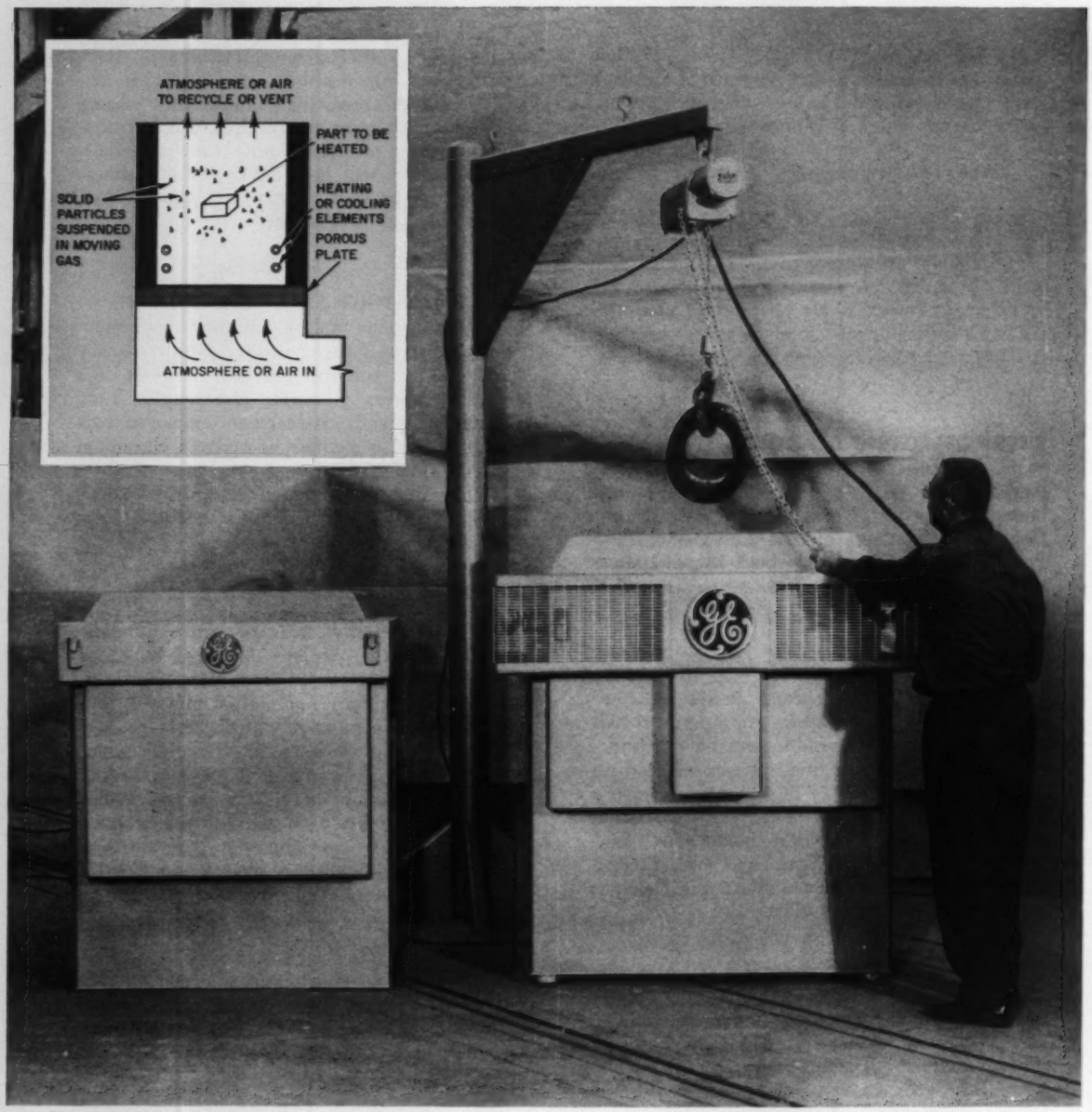
PLASMA JET TEST STAND— Electrically heated and ionized gas, accelerated to hypersonic velocity will soon be used to test materials for thermal shock resistance and aerodynamic reaction at North American Aviation Inc., Los Angeles. The high speed, high temperature plasma stream will determine, for example, the destructibility quotients of missile nose cone materials. The installation will be built by Allis-Chalmers Mfg. Co. with its associate company, Consolidated Systems Corp., Monrovia, Calif.

FASTER COATING DIFFUSION— You can get chromium coatings to diffuse into iron or molybdenum ten times faster if you use high frequency heat instead of conventional heat methods, says Metallic Surfaces Research Laboratories Ltd., Uxbridge, England. Researchers employed two, gas-solid diffusion methods as well as a chromium plating in temperatures ranging from 1652 to 2190° F. Details are contained in PB 149427, Office of Technical Services, Department of Commerce, Washington 25, D. C.

FASTER ALUMINUM WELD— An automatic, inert gas shielded technique developed by Kaiser Aluminum & Chemical Corp., Oakland, Calif. permits joining of 2 in. aluminum plates in only two passes. Keys to the improvement are high current density (450 amperes, 40 volts) which produces a fine spray transfer; large, long lasting, molten pool to allow escape of gases and oxides; fewer passes and less weld metal to reduce possibility of contaminants. The technique also cuts welding time and shielding gas consumption 50 per cent, Kaiser claims.

FIGHTING BACK— A lighter, abrasion resistant steel may make it possible for National Steel Corp., Pittsburgh, to counter aluminum's penetration (5 per cent) of the concrete transport mixer market. National has come up with a prototype mixer fabricated from the lighter steel. Although expected to cost $500 more than conventional units, lighter construction is claimed to give an owner a 4000 ton advantage in load carrying capacity during the equipment lifetime. National Steel claims that will mean $27,000 additional revenue for an owner.

Fluidized Bed Furnaces Offer



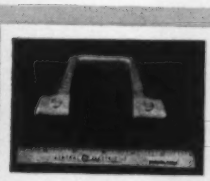
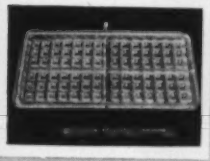
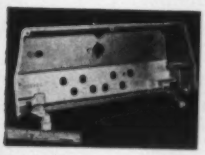
A NEW APPLICATION of the fluidized bed principle (furnaces for heating or quenching that feature rapid heat transfer and easy adjustability) has reached commercial status, reports the Industrial Heating Dept. (Shelbyville, Ind.) of General Electric Co., developer of the equipment. The department now has some of the furnaces on order.

No newcomer to industry, the process has been used in chemical reactions, ore treatment, precision casting, and the formation of plastic coatings.

Engineers look for the furnaces to be used in batch and continuous heat processing of ferrous and nonferrous metals.

The GE furnace was first shown

Speedy Heat Transfer

		HEAT	TIME
	Aluminum Casting 0.36 lb	900° F	Seconds 255
	Aluminum Waffle Iron 0.87 lb	900° F	160 Seconds
	Steel Balls 38.3 lb	1290° F	400 Seconds
	Aluminum Casting 4.85 lb	830° F	325 Seconds
	Steel Piston Rings 18.02 lb	1075° F	160 Seconds

publicly at the Metal Show in Philadelphia last fall (STEEL, Oct. 10, 1960, p. 176). Tests are being made on customer parts at Shelbyville to demonstrate furnace characteristics and develop performance data on specific jobs.

• Principal advantage of fluidized bed processing is the high rate of heat transfer.

One example: A basket of steel piston rings, weighing 18.02 lb, was heated to 1075° F in 160 seconds, as measured by a thermocouple welded to the center ring in the center stack of rings. The piston ring manufacturer told GE engineers that it took him 2400 seconds to heat to temperature in a conventional draw furnace.

GE engineers say the fluidized bed will permit an 85 per cent decrease in heating time when compared with radiation or convection furnaces. And in some materials, even higher rates can be obtained; ability of the material to absorb heat may be the limiting factor.

The fluidized bed material is inert to the work being processed. It serves only as a means of heat transfer. Thus there is no corrosion of parts in the furnace, no chemical reaction, no wetting. Engineers considered the possibility of abrasion from the bed material because it is in constant motion, found no evidence that it occurred. And the bed can be fluidized with a protective atmosphere for bright surfaces on heat treated parts, GE reports.

Within the work area, constant motion of the particles making up the fluidized bed levels temperatures, during both heating and cooling. Any heat gradients that exist are so low as to be difficult to measure. The fluidized bed can also be used as a quenching medium; in this type of service its quenching rate can be adjusted. It's intermediate to air and oil.

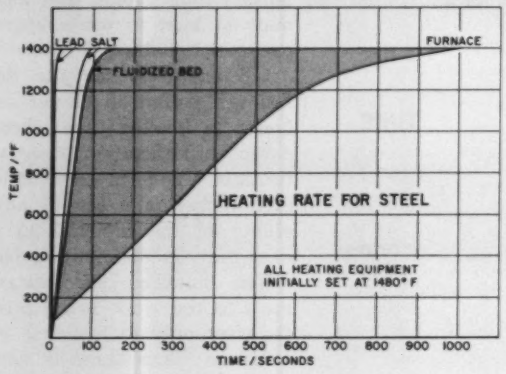
• Heating rates are variable, as well as high.

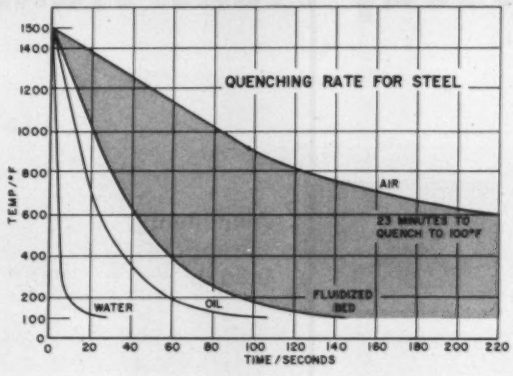
Heat transfer rates are evaluated in terms of the heat transfer coefficient, expressed as Btu per hour per degree Fahrenheit per square foot. For a typical box furnace, this value is about 5, John Stauffer, advance development engineer, explains. In thinking in terms of the fluidized bed units, rates in the range of 70 to 130 apply; but by adjusting the size, shape and type of particles, and the flow rate, the value may be set between 5 and 130.

The refractory particles carry the heat. They surround the work on all sides, get inside hollow parts.

Because the particles also surround the heating elements, they carry off the generated heat rapidly. This makes it possible to obtain high power input to the furnace, in small space, without short

Fluidized bed heat transfer rates can be varied within these ranges . . .





heating element life. Thus a conventional box furnace with a 2 x 2 x 2 ft work space could have a maximum rating of 30 kw; a fluidized bed furnace of the same working dimensions can use up to 100 kw, says Bill Blonn, project development engineer.

• The furnace is essentially isothermal, in spite of the high heating rate.

The combination of high heat capacity and high turbulence means little variation in temperature throughout the unit. Thermocouples placed in different positions show no evidence of hot or cold spots. Although there must be a gradient immediately adjacent to the heating elements or to a cold charge, it is of small dimensions. So there is little or no shielding effect, and even complex parts "see" the same temperatures on all sides.

Temperature variations within the part will depend on size and the thermal conductivity of the metal. You can supply heat at a greater rate than the metal can absorb, explains Mr. Blonn. So the greatest benefits of fluidized bed heating are realized on parts whose thickness is below that causing temperature gradients; as part size and section thickness increase, some benefits of rapid heating are lost.

The thickness at which negligible temperature variation is observed on heating will depend on the material. With stainless, for example, the maximum size would be a $\frac{5}{8}$ in. cube; for steel, $1\frac{5}{8}$ in.; magnesium, 5 in.; aluminum, 9 in.; and copper, 15 in.

• Kenneth G. MacDonald, manager of heat processing equipment sales, mentions customer interest in many application areas.

One use considered early in development of the equipment was the heat treatment of aluminum. The metal is hard to heat by radiation; it is a good reflector. But the fluidized bed permits rapid heating of aluminum.

Other nonferrous alloys are in the picture. In the annealing of copper and brass, rapid heating is helpful, and atmosphere may or may not be required.

Present temperature limitation of the unit is about 1700° F, which covers many of the ferrous alloys; development of units to operate even higher is in progress. But the present furnaces can be used for isothermal transformation processes, with the same bed material employed both in the austenitizing furnace and for quenching. And other standard heat treatments, such as hardening, annealing, normalizing, and quenching, are within the scope of the present fluidized bed.

"As we expected, our first application of fluidized bed furnaces was in the standard size range of batch processing equipment," explains Mr. MacDonald. "But industry is already pushing for special equipment for continuous lines. Manufacturers want units which occupy less floor space, and which will work into their present lines to shorten heat treating cycles."

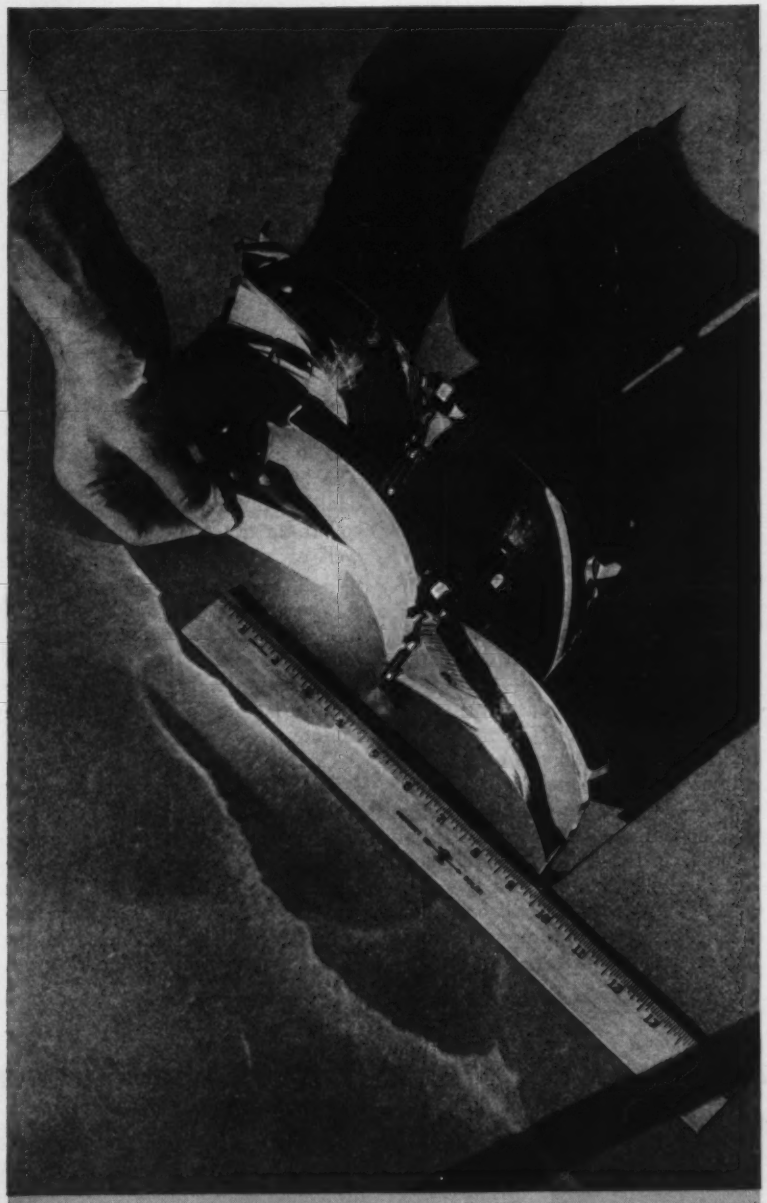
Development work in process, in addition to the investigation of higher temperature units, includes production studies on parts being considered for the new units. Use of atmospheres, studies on continuous heat treating, and multiple zone equipment are other areas.

Where long holding cycles are required, GE engineers see the fluidized bed being used for the heating portion of the process, with parts being transferred to a more conventional unit for holding at temperature.

• The fluidized bed principle has been used before, but not in commercial furnaces for heating metals, GE engineers believe.

Since about 1940, it has been used for catalytic cracking in refineries, relates Mr. Stauffer. The chemical and metallurgical industries have used it since about 1950 for ore reduction and separation of chemically similar metals like columbium and tantalum. It cuts down processing time and costs.

In the last five years, it has been used for the coating of parts. Using plastic powders in the bed, electrical parts have been encapsulated by heating and dipping in the powder; a similar process has been applied in forming protective coatings for such products as racks for household dishwashers. And fluidized sand beds are a means of stuccoing a ceramic slip in precision investment castings, for forming the shell molds.



Thin mirrors play fivefold role when . . .

Harnessed Sunlight Produces Electricity

MAN'S DREAM of getting electrical energy directly from sunlight is a step closer to reality.

The reason: An improved solar power converter developed by Ralph C. Schlichtig, product engineer, Boeing Airplane Co., Seattle.

Much of his device's unusual efficiency is attributed to its five-purpose metal mirrors. Made of aluminum only 0.005 in. thick, the paraboloids not only collect and focus sunlight on thermoelectric elements (they're made of lead telluride); they're also radiators (the backs are blackened), electrical connectors, heat conductors, and a structural frame for the entire assembly.

The unit's efficiency: Specific weight, 0.067 lb per watt; specific volume, 0.008 cu ft per watt; specific area, 0.620 sq ft per watt. Each unit puts out 90 milliwatts.

Those figures, claims Mr. Schlichtig, are based on a 2 per cent conversion efficiency of sea level sunlight. Theoretically, that should double in space, since solar radiation there is more than twice as great.

● **A converter has positive and negative thermoelectric elements which are a heat engine for producing electric power. A complete assembly (illustrated) has thermoelectric elements mounted between rectangular segments of paraboloids.**

The weight saving design eliminates the need for electrical insulation between thermocouples and heat sinks. Aluminum is light, strong, and a good conductor of heat and electricity.

The design also appears to have overcome some of the designer's concern about size of such devices. He points out that his thermoelectric units account for only one-tenth the weight of the converter. No pressure springs or complex hardware are required to overcome intolerable temperature gradients. Each hot metal junction is welded directly to its own focal target. Hot ends of each semiconductor pellet of lead telluride are joined directly to the cooler end of the corresponding metal part of the circuit.

Mr. Schlichtig concludes: "Junction temperatures achieved by miniaturization of our design permit over-all conversion efficiency nearly 100 per cent greater that that of a large generating unit with collected thermocouples."

Bethlehem Doubles Rebar Capacity

A NEW reinforcing bar mill and bar fabricating shop at Bethlehem Steel Co.'s Steelton, Pa., plant has doubled the company's capacity in face of competition from low priced imports.

Bethlehem now has the capacity to ship about 700,000 tons annually (about 30 per cent of what the whole industry shipped in 1959). The bars are the deformed, concrete reinforcing types in sizes from No. 3 to 11 inclusive. Finished products go into such construction projects as highways, apartments, factory buildings, dams, and bridges.

• The company says its large investment is evidence of its "faith in a growing America."

Bethlehem hopes to compete more effectively and obtain a larger slice of the market. One way cited: Cutting leadtime. "As far as the Steelton plant itself is concerned, this new mill—plus the recently completed improvements to the 20 in. mill and the new expanded line pipe mill (STEEL, Nov. 14, 1960, p. 112)—results in a greater diversification of products," says W. B. Lang, plant general manager. The plant has now attained a more favorable balance between ingots and finished products, Mr. Lang adds.

• The continuous type, two strand mill has 17 stands and two looping stands (repeaters).

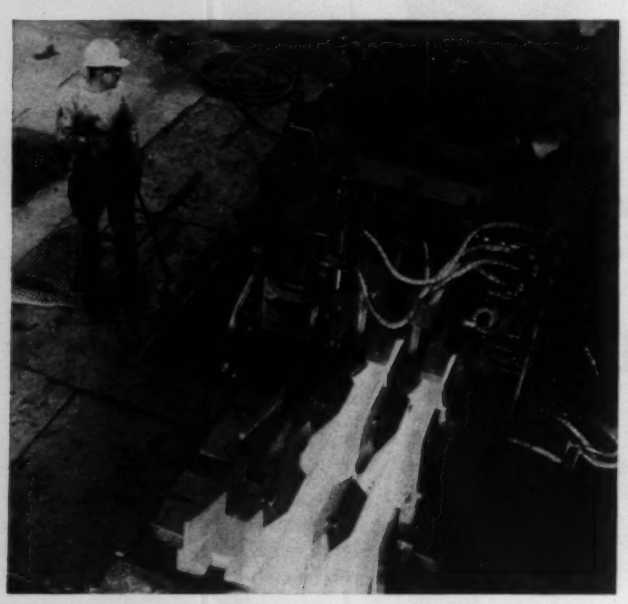
Three buildings house the facility. One (106 x 330 ft) contains the heating furnace and the mill. The second (391 ft long) is arranged crosswise to the long mill building and houses the shearing and shipping facilities. The cooling bed building (70 x 360 ft) is at the end, in line with the main mill building.

An oil fired, continuous heating furnace is installed ahead of the mill for heating 4 x 4 in. billets (40 ft long) supplied by the Steelton rail mill. Two hot beds with shearing facilities at the discharge end complete the main facilities. The layout of the mill will permit addition of finishing stands and coilers for the production of rods as well as reinforcing bars.

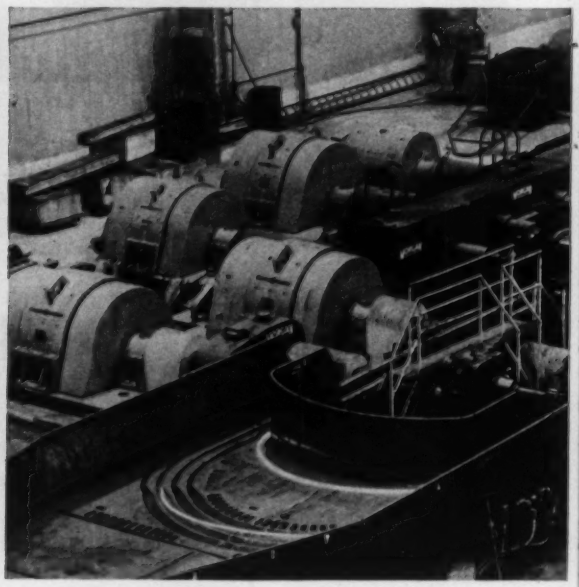
• The mill can produce about 1 mile of No. 3 (⅜ in. diameter) rebars from one 4 x 4 in. x 40 ft billet with the bar moving to the cooling beds at a rate of 2600 ft a minute.

Double stranding permits manufacture of more than 5200 sixty ft lengths of No. 3 bars per hour. A 5 ton bundle of No. 3 rods can be shipped every 10½ minutes. The larger, heavier bars can be bundled and shipped even faster. For example, No. 11 size (which requires only 32 rods per 5 ton bundle) can

Billets go from furnace to roughing mill



Bars moving at about 2600 fpm . . .



be loaded in less than 5 minutes per bundle.

• Quality is kept high in the versatile mill.

Quick acting, electronic devices leave little chance for human error. Only new, open hearth, billet steel is fed into the mill. Changeover from any one bar size to another requires only the adding or subtracting of roughing and finishing stands. Special cutoffs permit the production of small amounts of special sizes without undue interruption of big production runs.

• One operator controls picking and sorting of billets, charging them into the furnace, and moving them down the sloping hearth.

The operator must wait for signals from the discharge end of the furnace before charging another pair of billets. When double stranding for No. 3 to 6 bars is being performed, two billets are fed simultaneously into the roughing stands. Single stranding is used for sizes from No. 7 to 11, and only one billet is fed at a time.

A pullout and switch plate at the discharge end of the furnace feeds the red hot billets to a toggle shear (for special items) or directly to the nine stand, roughing mill if standard rebars are being made.

The 4 x 4 in. billet emerges from the roughing mill as a 1 or 2 in. square. Two crop and cobble shears cut the "cold" front end off the bar (about 1 in.). If a foulup occurs, the shears are operated to quickly cut the product to scrap pan sizes to eliminate cobble and get it out of the line.

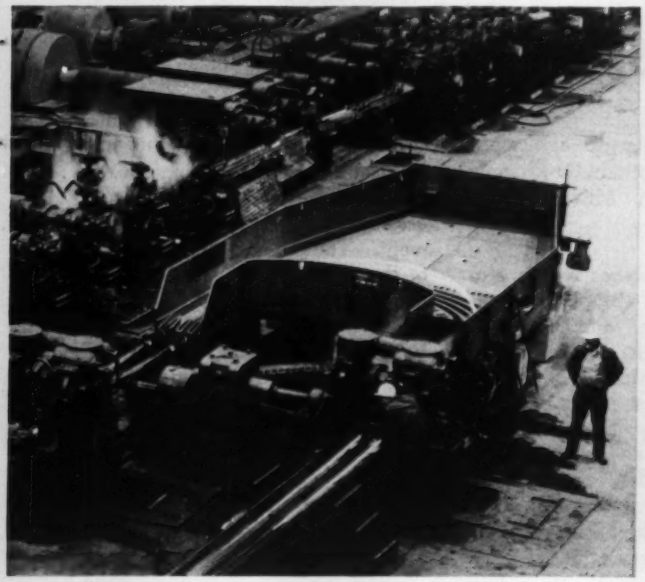
• Two repeaters or looping stands in the line have large steel pans that allow the bar to flex and flare out if there is any difference in relative speed at the leading or trailing end.

Kickouts and snap shears in the repeaters are safeguards. They can kick the bar out of the grooved track to prevent kinks and cut off the flow in case of line foulups.

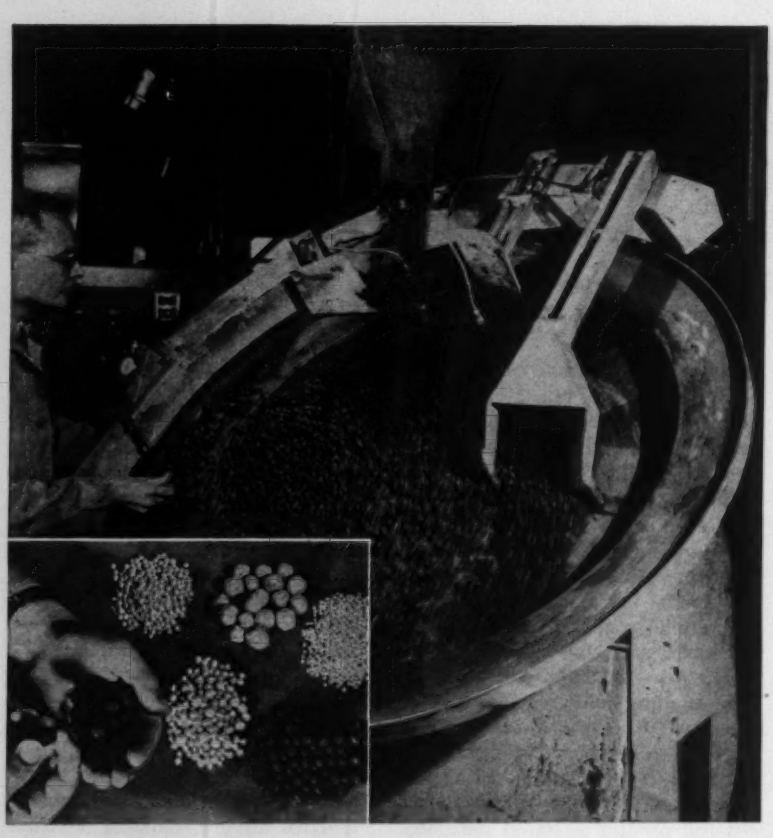
A tachometer on finishing stand 15 or 17 (depending on bar size) measures the length of the finished product. It sends electronic signals to the automatic, rotary drum, dividing shear (just ahead of the cooling beds). The shear can also be operated manually.

The rebars are bundled into 5 ton shipping lots. Substandard lengths can be handled mechanically. Cranes move the wire bound bundles to a storage area or directly onto rail cars. The company's fabricating shop is set up to cut, bend, bundle, and tag rebars for immediate field installation.

. . . flare and flex in looping stands



Bars move across cooling beds



Lime dust Rock wool fiber Weed killer
Coal fines Porcelain enamel Iron ore

Tests with metals, minerals, chemicals show . . .

Pelletizing Gains Scope Via Salvaging, Processing

MANY MATERIALS discarded as waste may be saved for further processing, and others may be made more marketable by disc pelletizing. The process was once used primarily for preparation of cement or iron ore sinter mixes.

Conversion of fines and powders into pellets large enough for commercial use has been studied for more than four years at Dravo Corp., Pittsburgh. About 80 materials have been included in the tests. Result: Pelletizing has been found practical for many materials previously thought unsalvageable.

Pelletizing equipment is made by Dravo under a license agreement with Lurgi Gesellschaft fur Chemie und Huttenwesen MBH, Frankfurt, Germany.

• The process reclaims wastes economically, makes for more convenient handling, and upgrades materials for further processing.

Fines from materials like rock wool, which were previously trucked away to a waste dump, can now be pelletized and fed back into the furnace. Pelletizing facilitates handling and packaging of many materials often sold as powders and improves their marketability.

In many cases, the process offers economical preparation of powdered or granular products for further processing steps, such as sintering, firing, drying, or roasting. Pelletizing is an intermediate step in those processes, and its low cost makes it attractive. Example: Small particles of beryllium ore can be agglomerated before they are fed into a muffle furnace to make beryllium oxide at modest cost.

• Simple tests usually determine feasibility of pelletizing materials.

Exploratory tests are made with a 14 in. disc in Dravo's research center, to see if pelletizing can be done on a larger disc.

Later, pilot tests are conducted on a 39 in. disc, at the research center, or on rented equipment in the customer's plant. The tests usually substantiate results obtained on the smaller unit and indicate continuous or semicontinuous production rates. They also help determine the size disc needed —up to 16½ ft in diameter—for optimum production.

The discs can be used to make pellets as small as 8 by 30 mesh, but 1/16 to 1½ in. balls are thought to be most practical.

• Engineers expect the discs to gain popularity for pelletizing many metals, minerals, and chemicals.

The discs agglomerate materials by a rolling action, in which a small nucleus increases in size as it travels around the circumference. Fines are fed into the disc continuously; water or other liquid added as a fine spray dampens the powder and causes particles to cling to one another more readily.

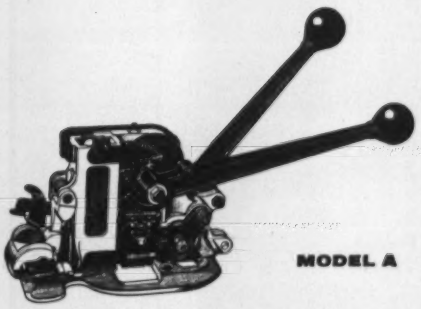
Chromium oxide can be pelletized and fed into a reactor to make a chromium alloy. Chromium concentrate can be agglomerated and used as a feed for hardening equipment. The pellets can also be used in the production of ferrochrome.

Some other materials proved practical for pelletizing: Lead baghouse dust can be agglomerated for reintroduction to melting furnaces; alumina dust can be pelletized and fed back into the alumina pots; raw sand, soda ash, and other ingredients can be balled for glass furnace feed; and borax base weed killer can be pelletized for bagging and direct sale.

Use 5/8" or 3/4" strapping?

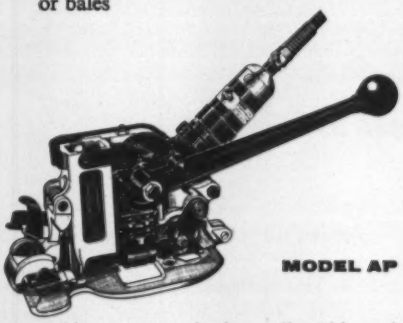
Choose right from this one full line of combination tools

for steel strapping in all sizes from 5/8"x.015" to 3/4"x.035"



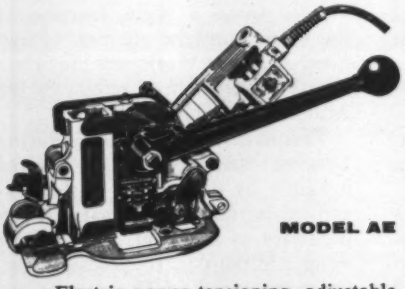
MODEL A

- Manual tensioning, sealing and severing. One handle tensions, the other seals and severs with a single stroke
- Rugged, easy to use...for high tension applications on heavy loads, such as paper, bricks, ingots, crates, machinery or bales



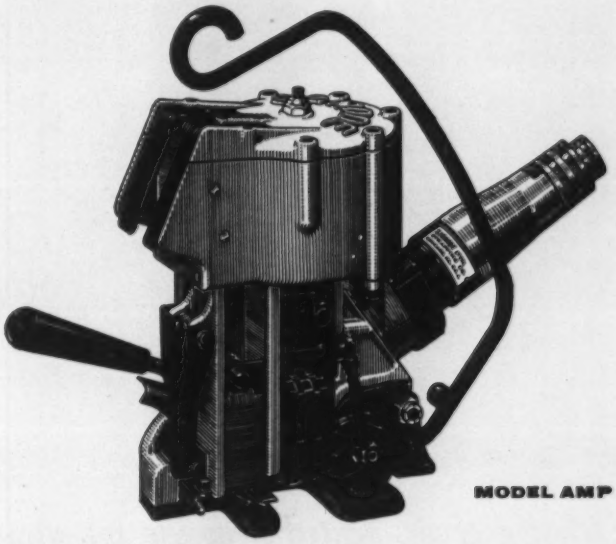
MODEL AP

- Air power tensioning, adjustable and automatically regulated
- Applies pre-set tension every time
- Manual single-stroke sealing and severing
- Automatic seal feed magazine holds 75 seals



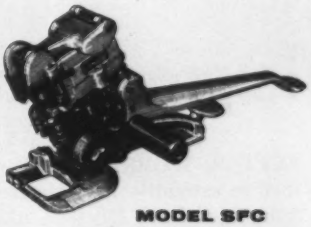
MODEL AE

- Electric power tensioning, adjustable and automatically regulated. Also applies pre-set tension every time
- Manual single-stroke sealing and severing
- Automatic seal feed magazine holds 75 seals



MODEL AMP

- Fast, new all-power-operated portable tool from Signode
- Air power tensioning, sealing and severing, all push-button controlled
- Tensioning is adjustable and automatically regulated
- Automatic seal feed magazine holds 75 seals



MODEL SFC
the only one-hand strapping tool

- Manual tensioning and sealing; strap is scored rather than severed
- Because seals are fed from a magazine and the tool weighs only 6 pounds, one-hand operation is convenient
- Unexcelled tool for general shipping room use, with 3/8", 3/4" (and 1/2") strapping up to .023" gauge.

Signode offers the only complete line of combination tools for 3/8" and 3/4" steel strapping—lets you choose the right tool for efficient strapping at the speed your operations require. Let us ask the Signode man near you to demonstrate any or all of these tools...or write for free booklets #238 and #251.

First in steel strapping

SIGNODE
STEEL STRAPPING CO.

2645 North Western Avenue • Chicago 47, Illinois

Offices Coast to Coast. Foreign Subsidiaries and Distributors World-Wide
In Canada: Canadian Steel Strapping Co., Ltd., Montreal • Toronto

Exclusion of air, limited scrap use cut nitrogen content as . . .

Oxygen-Steam Converters Improve Steel's Ductility

BETTER WORKABILITY—attributed to extremely low nitrogen content—is claimed for steel made in a new, oxygen-steam converter plant at the Abbey Works, Steel Co. of Wales, Margam, South Wales.

The company's most recent development plan provided for an increase in capacity of 12,000 tons per week via three, 50 ton vessels, blown with a mixture of oxygen and steam. Current output from the converters is 11,500 tons a week.

A fourth converter, to be installed in about a year, is expected to increase ingot output from the process to about 19,000 tons a week. Before the converters were put into use, melting capacity at the plant was about 48,000 tons a week.

• Limited use of scrap in the charge and blowing with a steam-oxygen mixture are said to give the product an extremely low nitrogen content —and better ductility.

The steelmaking method is called the VLN, or "very low nitrogen" process. The product is said to contain only one-third as much nitrogen as open hearth steels.

Nitrogen is excluded from the process by using a 100 per cent oxygen-steam blast. The charge consists mostly of molten iron, instead of large quantities of scrap. That makes for minimum introduction of tramp elements, such as nickel, copper, chromium, and tin. Result: Large quantities of the steel have been subjected to the most difficult draws with favorable results.

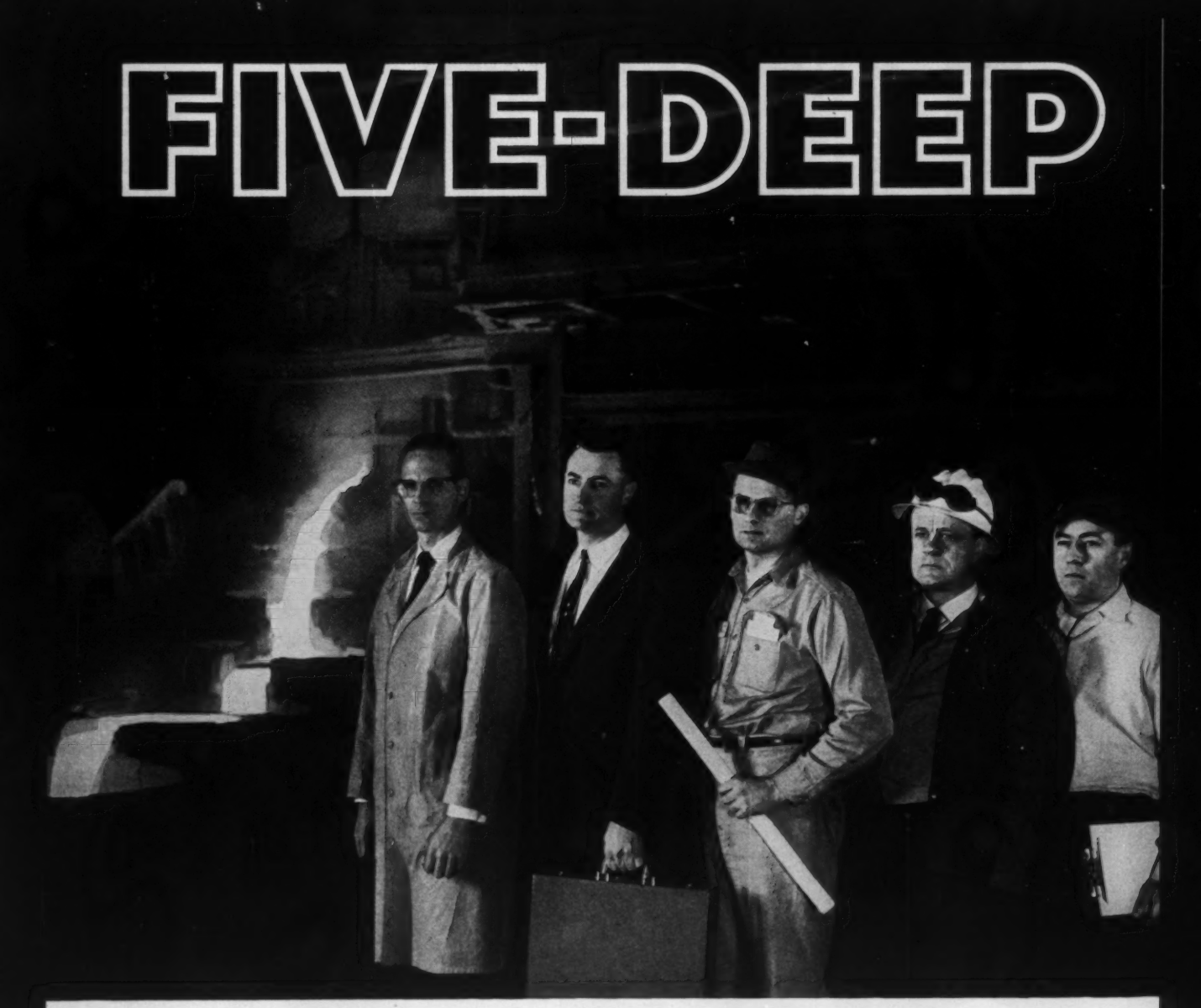
• The method differs considerably from other converter processes. Temperature control and operating costs are said to be good.

Air blowers are ordinarily used with other oxygen-steam converters. Frequent introduction of air is thought to improve bottom and lining life. But air in the blast is said also to cause a slight increase in the steel's nitrogen content. Engineers at Abbey Works say they have solved the problem of refractory life without using air.

Temperature of the charge during blowing can be raised or lowered instantly by adjustment of the oxygen-steam ratio. That makes it unnecessary to interrupt the blow for scrap additions to counteract excessive temperatures. The charge temperature can also be elevated by increasing the oxygen-steam ratio.

Up to 15 per cent of scrap has been used in the vessels, which are said to be less expensive to operate than the company's open hearths.

FIVE-DEEP



Millions have been made and saved

with UCM's "FIVE-DEEP" Ferroalloys

Metal producers in their ceaseless drive to improve products and profits are learning the value of Union Carbide Metals' FIVE-DEEP ferroalloys. Here are some of the advantages these alloys provide.

Five Extra Values in Depth

1 Technology—many million dollars a year, invested in UCM's 600-man research and development center—helps you produce more profitable metals. The payoff has been progress—over 100 new alloys and metals—providing countless ways to improve your products.

2 Customer Service brings you our integrated experience in the application of ferroalloys to various melting practices. Engineers from 9 UCM field offices travel a million miles a year to provide on-the-scene technical assistance.

3 Global Ore Sources assure you uninterrupted supplies of ferroalloys. UCM's close association with many mines throughout the world provides dependable raw material sources.

4 Unmatched Facilities free you from delivery worries. Only UCM gives you 6 plants—3 with their own power facilities—and 17 warehouses, all located for fast shipments by rail, truck, or water.

5 Strictest Quality Control—with over 100,000 tests per month from mines to shipment—makes sure you always get alloys of uniform size and analysis, with minimum fines, lot after lot.

For better metals, production economies, bigger profits, insist on UCM's FIVE-DEEP alloys. Union Carbide Metals Company, Division of Union Carbide Corporation, 270 Park Avenue, New York 17, N. Y., producer of "Electromet" brand metallurgical products.

"Union Carbide" and "Electromet" are registered trade marks of Union Carbide Corporation.

UNION CARBIDE METALS

Only **ELECTROMET** ferroalloys from **UCM** are so deep in extra values to help you.

NEW

MODEL III

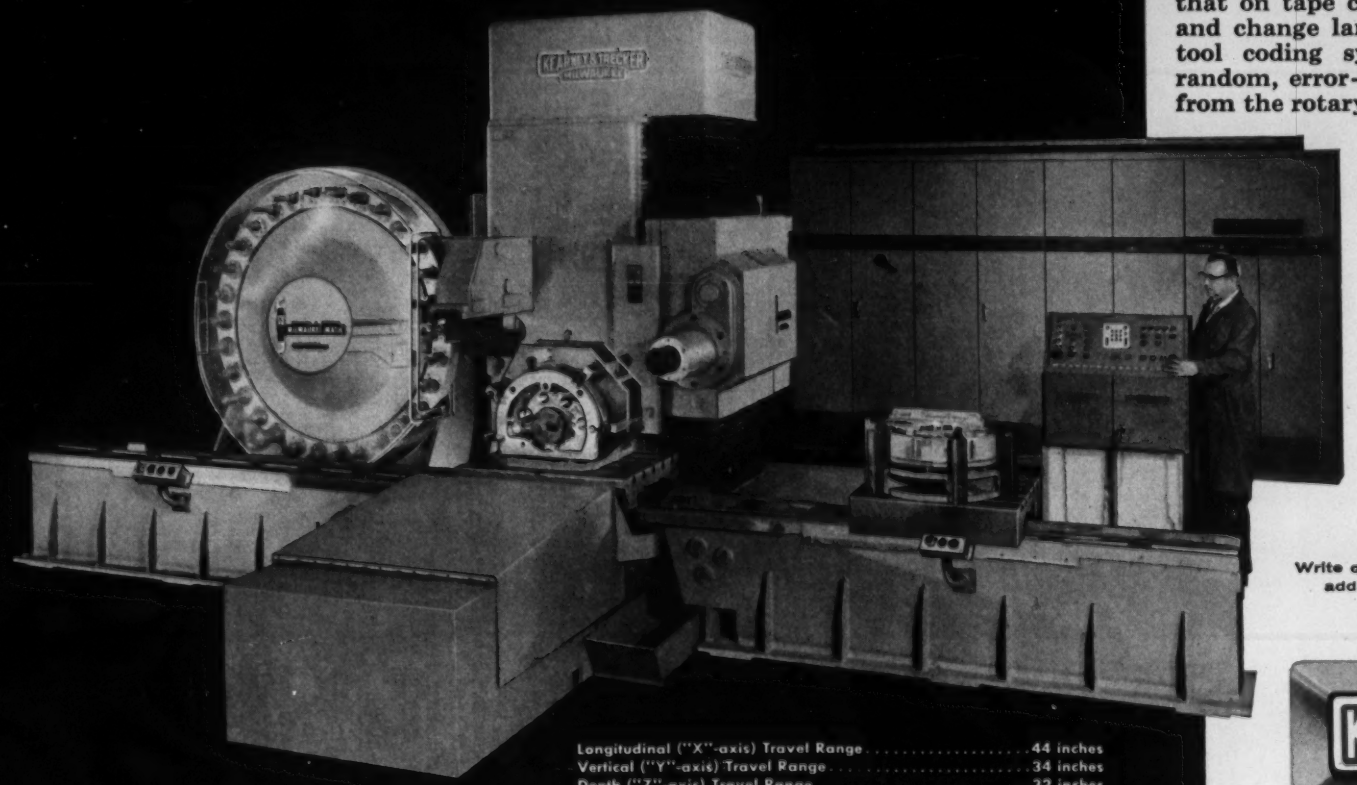
KEARNEY & TRECKER

MILWAUKEE-MATIC

WITH THE

AUTOMATIC TOOL CHANGER

that on tape command can automatically select and change large tools in 15 seconds. Exclusive tool coding system provides for the possible, random, error-free selection of 961 different tools from the rotary tool storage magazine.



Longitudinal ("X"-axis) Travel Range	44 inches
Vertical ("Y"-axis) Travel Range	34 inches
Depth ("Z"-axis) Travel Range	32 inches
Work Pallets—Surface Area	28″ x 36″
Automatic Index Table—to any of 360-1° positions	at 5 rpm
Rotary Tool Storage Magazine	30 tools capacity, plus one tool in spindle
Max. Tool Dia. Automatically Changed	6 inches

Tools can be added to, or removed from any position in the magazine at any time.

This new, time-slashing, profit-producing MODEL III extends the *Manufacturing with* MILWAUKEE-MATIC *CONCEPT* to larger workpieces . . . combines high horsepower with high precision.

"*. . . almost human — only better — it doesn't make mistakes*" . . . "*I see it, but I still don't believe it*" — were typical of the comments made by experienced machine tool buyers, on seeing this pace-setting MODEL III in action here at the birthplace of the *Manufacturing with* MILWAUKEE-MATIC *CONCEPT*.

Write or call for complete information on this new addition to the MILWAUKEE-MATIC family.

Numerical Control Division

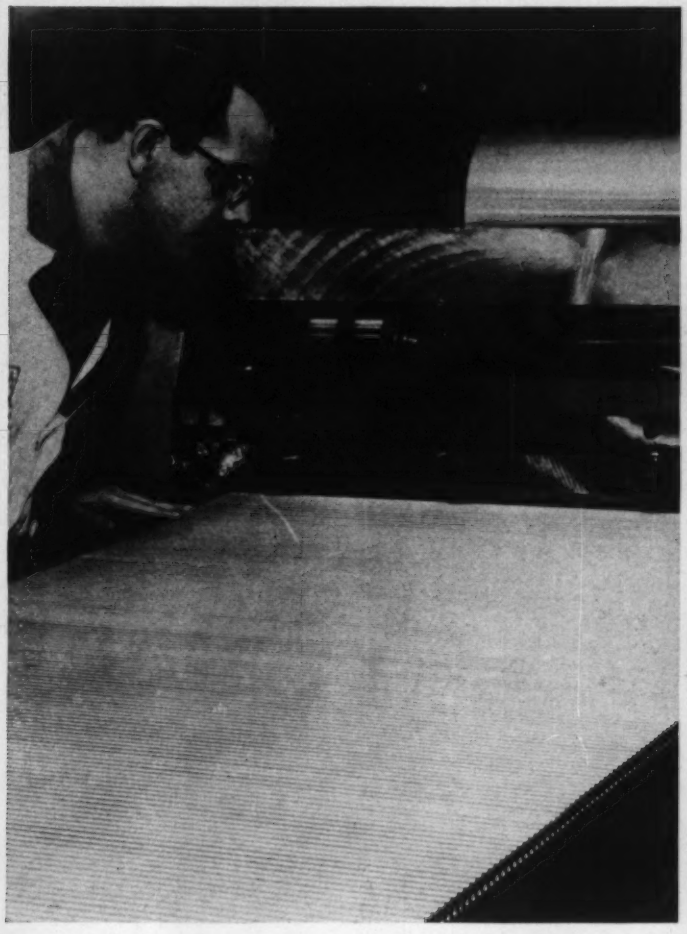
KEARNEY & TRECKER MILWAUKEE

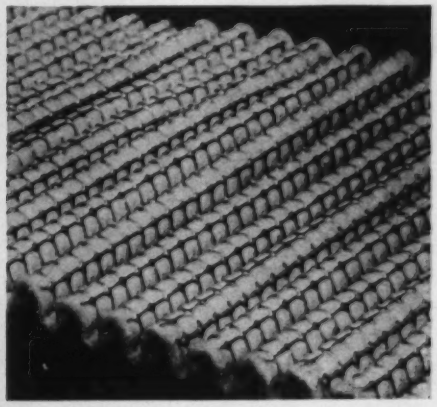
KEARNEY & TRECKER CORP.

6800 W. NATIONAL AVE. • MILWAUKEE 14, WIS.

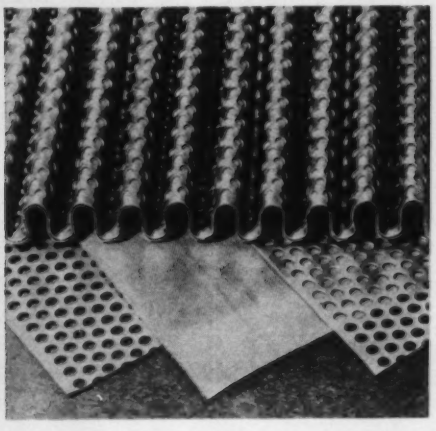
(Phone GReenfield 6-8300 . . . Direct Distance Dialing Code 414)

Machine pleats filter materials such as wire braced felt and metal cloth





with minimum impact damage



Accuracy, Economy Stressed In Filtermaking Method

METALLIC and nonmetallic filter materials (and combinations) are being turned out by Twin Coach Co., Buffalo, in pleated form by a close tolerance process.

The key is a machine that folds the materials into corrugated shapes (in contrast to the traditional method of forming corrugations by drawing). One of the features of the process is a cam controlled action which moves the forming die in horizontal and vertical planes.

• Micronic metal cloth can be pleated with a minimum of impact upon its original characteristics.

There is no distortion of micronic capability because little stress is introduced to the material. Some micronic material that has been pleated has had as many as 500,000 perforations per square inch.

• Pleated materials include steel, copper, brass, aluminum, cloth, felt, and paper.

The folding machine can simultaneously pleat and laminate different materials.

Example: Cloth can be pleated and laminated between steel metal mesh to provide additional stability and strength.

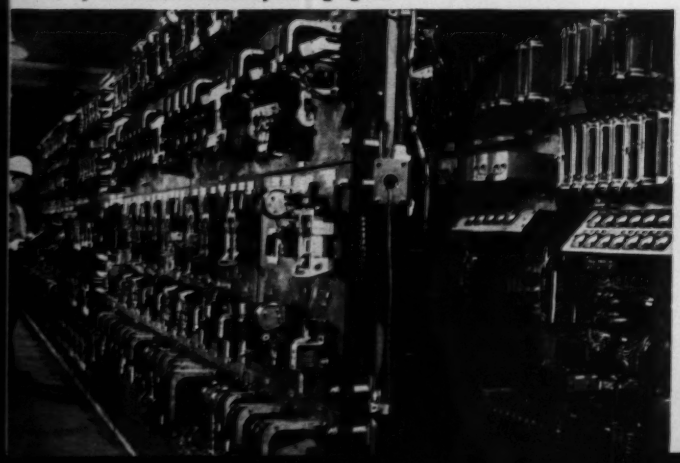
The pleated materials are used to provide effective filtering within a limited dimension.

• The process is three to four times faster than other methods, says Twin Coach, providing substantial production economy.

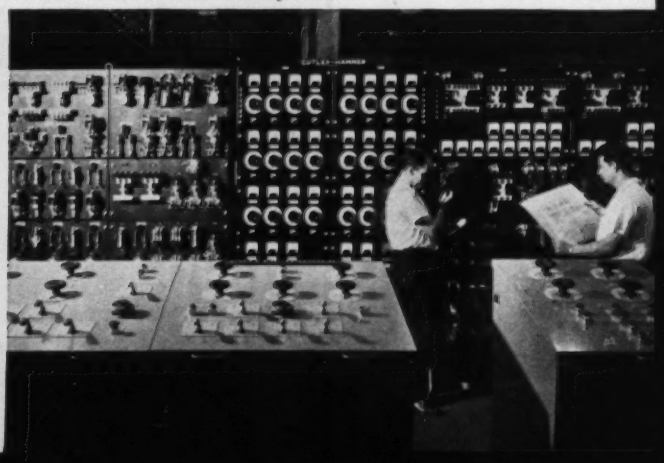
Accuracy is high and tolerances obtained have been well within specification limits in all cases. The company adds that cost of forming dies is below those for traditional forming methods.

Twin Coach plans to lease its folding machines.

Cutler-Hammer Control. Shown here, the control of 87 D.C. motors, employing 16 static regulators. Kaiser annealing line control system also regulates 45 A.C. auxiliary motors; requires 10 operators' stations and more than 300 meters, pushbuttons, master switches, potentiometers and operating lights.



Cutler-Hammer Test Floor. Here, complete factory tests of systems control prior to shipment insure faster installation, more trouble-free start-ups. Analog computer-simulator can test engineering solutions before construction; simulate response of any motor or machine to aid in actual factory tests.



What's new in systems control?

Cutler-Hammer Control commands 1600 h.p. High Speed Annealing line at Kaiser Fontana

Big D-c system meets demanding requirements on 1200-FPM line

The responsibility for making the block-long system of huge equipment in a modern annealing line function continuously and in perfect step falls on control engineering. For this responsibility, including all control and rotating equipment, Kaiser selected Cutler-Hammer in the recent expansion of its Fontana works.

The problem: a continuous flow of steel strip through entry, furnace and recoil sections . . . through looping towers on each side of the furnace . . . at 1200 to 1500 FPM!

Laboratory testing speeds trouble-free start-up

Each step posed a critical control problem. Yet Cutler-Hammer's systems and control engineers bound the whole into a smoothly operating team. The entire system was pre-tested in Cutler-Hammer laboratories. Result: Kaiser-Fontana reaped the benefits of a more complete test, quicker installation, and a faster, more trouble-free start-up. Kaiser today produces the uniform quality tinplate demanded by its customers.

Cutler-Hammer control systems and equipment were installed on seven of the first nine high-speed annealing lines built. Cutler-Hammer engineering and equipment is also at work on the Fontana pickling line, coil preparation line, and in auxiliaries for slabbing, hot strip and temper mills.

Call the C-H man . . . early!

Cutler-Hammer's broad experience in all phases of systems control design means the Cutler-Hammer man brings a knowledgeable eye to your particular control problem. Cutler-Hammer procedures insure a complete pre-test of your system. Assure you a quicker installation and a faster, trouble-free start-up. Call your nearby Cutler-Hammer office early.

WHAT'S NEW? ASK...

CUTLER-HAMMER

Cutler-Hammer Inc., Milwaukee, Wisconsin • Division: Airborne Instruments Laboratory • Subsidiary: Cutler-Hammer International, C. A. • Associates: Canadian Cutler-Hammer, Ltd.; Cutler-Hammer Mexicana, S. A.

For Quality and Economy Use

MALLEABLE

For Service Contact...

CONNECTICUT
Connecticut Mall. Castings Co., New Haven 6
Eastern Malleable Iron Co., Naugatuck

DELAWARE
Eastern Malleable Iron Co., Wilmington 99

ILLINOIS
Central Fdry. Div., Gen. Motors, Danville
Chicago Malleable Castings Co., Chicago 43
Moline Iron Works, Moline
Moline Malleable Iron Co., St. Charles
National Mall. and Steel Castings Co., Cicero 50
Peoria Malleable Castings Co., Peoria 1
Wagner Castings Company, Decatur

INDIANA
Albion Malleable Iron Company, Muncie Division, Muncie
Link-Belt Company, Indianapolis 6
National Mall. & Steel Castings Co., Indianapolis 22

IOWA
Iowa Malleable Iron Co., Fairfield

MASSACHUSETTS
Belcher Malleable Iron Co., Easton

MICHIGAN
Albion Malleable Iron Co., Albion
Auto Specialties Mfg. Co., Saint Joseph
Cadillac Malleable Iron Co., Cadillac
Central Fdry. Div., Gen. Motors, Saginaw

MINNESOTA
Northern Malleable Iron Co., St. Paul 6

MISSISSIPPI
Mississippi Malleable Iron Co., Meridian

NEW HAMPSHIRE
Laconia Malleable Iron Co., Laconia

NEW YORK
Acme Steel & Mall. Iron Works, Buffalo 7
Frazer & Jones Company Division Eastern Malleable Iron Co., Solvay
Oriskany Malleable Iron Co., Inc., Oriskany
Westmoreland Mall. Iron Co., Westmoreland

OHIO
American Malleable Castings Co., Marion
Central Fdry. Div., Gen. Motors, Defiance
Dayton Mall. Iron Co., Ironton Div., Ironton
Dayton Mall. Iron Co., Ohio Mall. Div., Columbus 16
National Mall. and Steel Castings Co., Cleveland 6

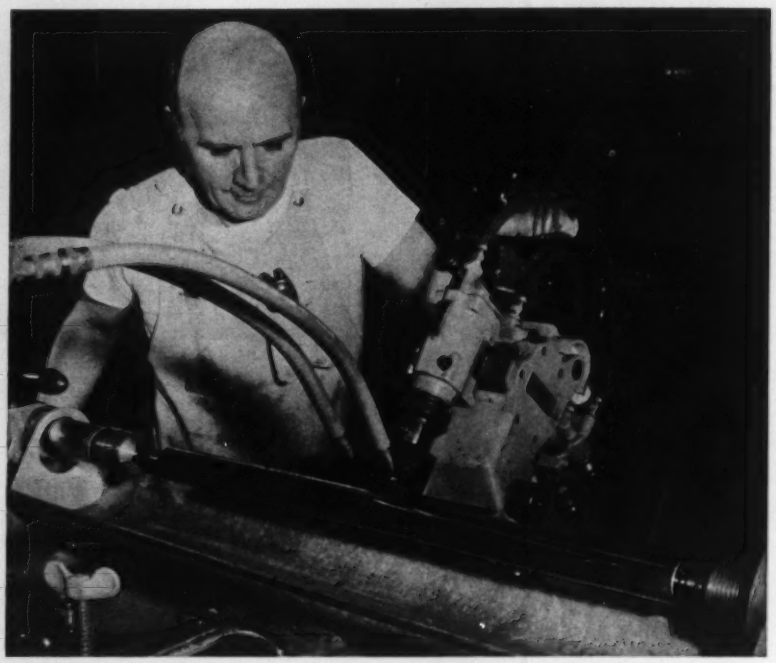
PENNSYLVANIA
Buck Iron Company, Inc., Philadelphia 22
Erie Malleable Iron Co., Erie
Lancaster Malleable Castings Co., Lancaster
Lehigh Foundries Company, Easton
Meadville Malleable Iron Co., Meadville
Pennsylvania Malleable Iron Corp., Lancaster

TEXAS
Texas Foundries, Inc., Lufkin

WEST VIRGINIA
West Virginia Mall. Iron Co., Point Pleasant

WISCONSIN
Belle City Malleable Iron Co., Racine
Chain Belt Company, Milwaukee 1
Federal Malleable Company, Inc., West Allis 14
Kirsh Foundry Inc., Beaver Dam
Lakeside Malleable Castings Co., Racine
Milwaukee Malleable & Grey Iron Works, Milwaukee 46

These companies are members of the Malleable Castings Council



Oscillating head goes to work as . . .

Diamonds Finish Mill Rolls To Close Tolerances

PRODUCTION MEN at Anaconda American Brass Co.'s Waterbury, Conn., plant find that long face, tungsten carbide rolls used in their Sendzimir mills can produce a superior finish on cold rolled brass strip. But the hard carbide presents a problem in roll finishing. Anaconda solves it with diamond impregnated stones.

Rolls must be machined to close tolerances (within 0.0001 in. of the nominal 1.640 in. diameter over the full 27 in. length). Specified surface finish is only 2 to 4 microinches rms. That finish is needed to produce a comparably high finish on the rolled strip.

• Small, diamond impregnated inserts in an oscillating head do the finishing.

Refinishing is done with a Taft-Peirce, Supfina honing head (STEEL, July 27, 1959, p. 110). The head oscillates in contact with the revolving roll, to provide a closely controlled finish.

Four sizes of diamonds are used. Resinoid bonded inserts, $\frac{1}{8}$ x $\frac{3}{8}$ x $1\frac{1}{8}$ in., hold the natural diamond powder in the hone head. During honing, the carbide roll (83.3 Rockwell A) is cooled at point of contact by a flow of oil and kerosine (10 parts mineral seal oil to 1 part kerosine).

After honing, the rolls are also polished with diamond micron powder in paste, using a cotton daub and hardwood block.

Time required to hone the rolls to specified dimensions varies with the amount of carbide stock removed. It is considered uneconomical to remove more than 0.001 in. depth stock from the rolls. Carbide rolls received in good condition may require only a few minutes. Heavily used rolls may take as much as 4 hours to restore the required concentricity and finish.

Tool and Hardware Manufacturers Use Malleable for the Parts They Guarantee...

"Guaranteed Against Warping or Breaking" is the seal of quality often found on tools and hardware made of Malleable iron. Frequently Malleable components are guaranteed while the other materials in the same tools are not.

Proven performance superiority has induced many tool and hardware manufacturers to switch to Malleable castings so they, too, can guarantee their products. At the same time, they often reduce their costs. How? Because Malleable provides more strength per dollar than any other metal; Malleable is the most machinable of all ferrous metals of similar properties; Malleable is truly outstanding for its toughness, ductility, castability and corrosion resistance. While Malleable's natural appearance is attractive, a wide variety of finishes can be applied for added customer appeal.

Improve your products by using Malleable castings. Check with any Malleable producer that displays this symbol —

MEMBER

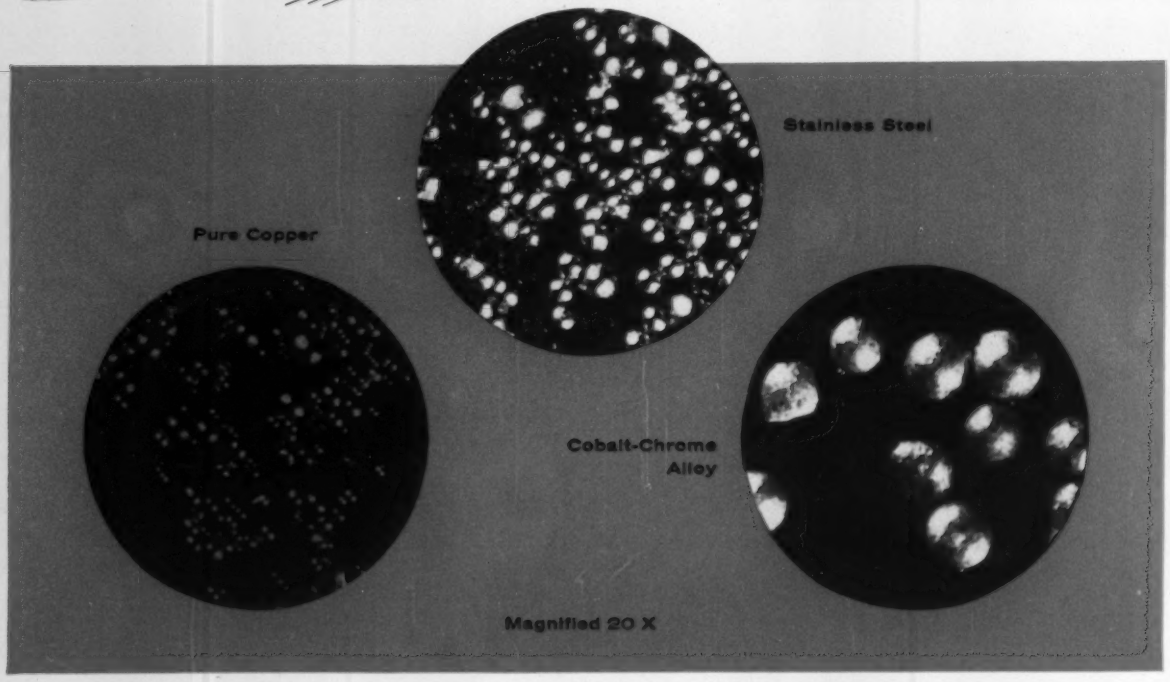
MALLEABLE

CASTINGS COUNCIL

Profitmaking Ideas are yours free in our Data Unit No. 114, available from any member foundry, or Malleable Castings Council, Union Commerce Building, Cleveland 14, Ohio.

The manufacturer of this unit converted his entire line of machinist vises to Malleable... then guaranteed them against breakage. Not one claim has been made in three years!

TOCCO Induction Melting provides precise control for new metal powder process



A new metal atomization process produces fine, pure, high-temperature metal and alloy powders of accurate particle size and shape. It was developed by Federal-Mogul Division of Federal-Mogul-Bower Bearings, Inc. at their Research Laboratories in Ann Arbor, Michigan.

A very important part of this process is the ability of the Tocco melting equipment to produce clean, molten metal, at the exact temperature required, quickly and efficiently. Three interchangeable Tocco melting furnaces used with the Tocco 100 KW 3 KC motor generator and furnace control provide the versatility necessary to enable Federal-Mogul to process many different metals without expensive, time-consuming change over.

Regardless what your metal heating problem is—melting, heating for forming, heat treatment—it will pay you to investigate Tocco application engineered induction heating.

THE OHIO CRANKSHAFT COMPANY

Mail Coupon Today— **NEW FREE Bulletin**

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Please send copy of "The Case for Induction Melting"

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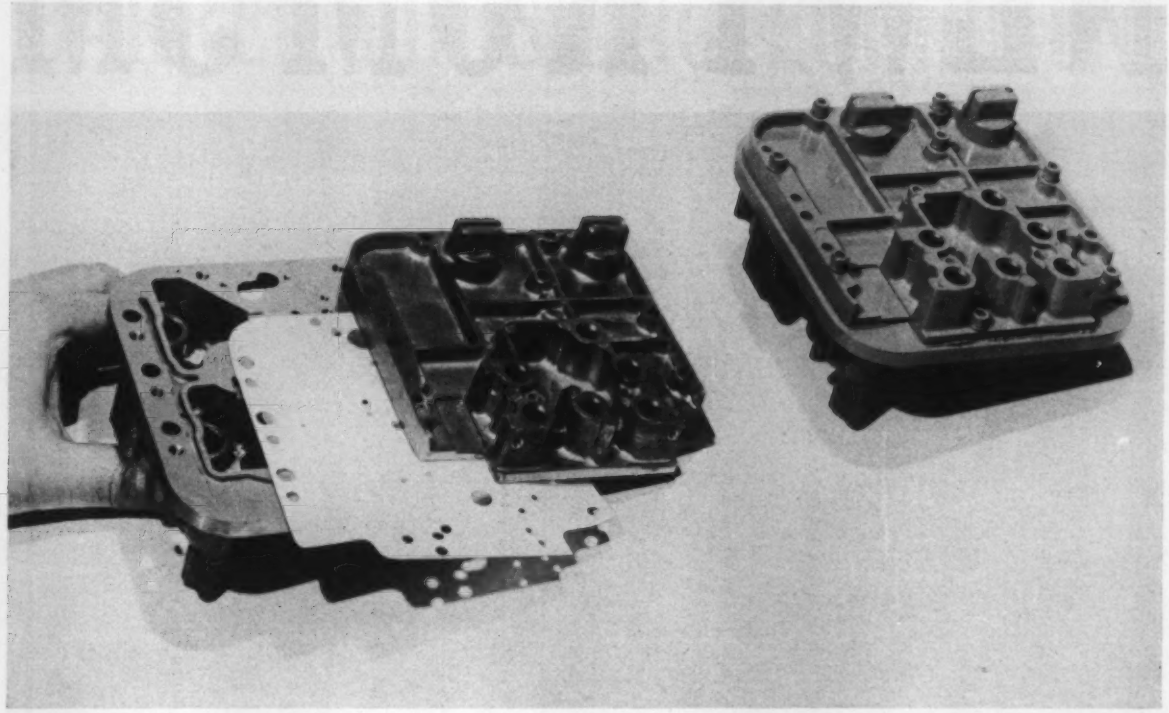
Autos Eyed for Boost in Adhesive Joining



Manifold assembled with die cut film adhesive

CONTINUED emphasis on economy, design, and weight reduction will bring about greater automotive use of high strength adhesives, says Minnesota Mining & Mfg. Co., St. Paul.

Several advantages are claimed by 3M for increased interest: 1. Adhesives form continuous bonds and distribute stress loads over the entire joined area. 2. They reduce fatigue stress in metal assemblies (by damping and absorbing vibrations). 3. The material acts as a continuous protective barrier between dissimilar metals and reduces corrosion. 4. No gaps, bulges, external projections, or surface mars are evident at joints. 5. Materials difficult to join by other means can often be effectively joined by adhesives.

The company says that two pieces of metal joined together by only 1 sq in. of bonded area can support a load equivalent to the combined weight of a six passenger automobile fully loaded and with a full fuel tank and still provide a safety margin of nearly 50 per cent.

• Doors and body sections using adhesive bonded sandwich structures would be lightweight, high strength units.

In designs using thin or light sheet metal, adhesives can bond reinforcing or stiffening members to body sections, roofs, hoods, and trunks.

With tensile strengths of 10,000 psi, structural adhesives are practical in assembling door and trunk hinges, mounting brackets and hemming flanges on automobiles, says 3M. Adhesive bonding of trim moldings can eliminate the need for holes in the car body and seal the area from corrosion problems, it points out.

Other 3M suggestions:

• Adhesive joining of the two halves of plastic radiator reservoir tanks should that type of radiator come into general use.

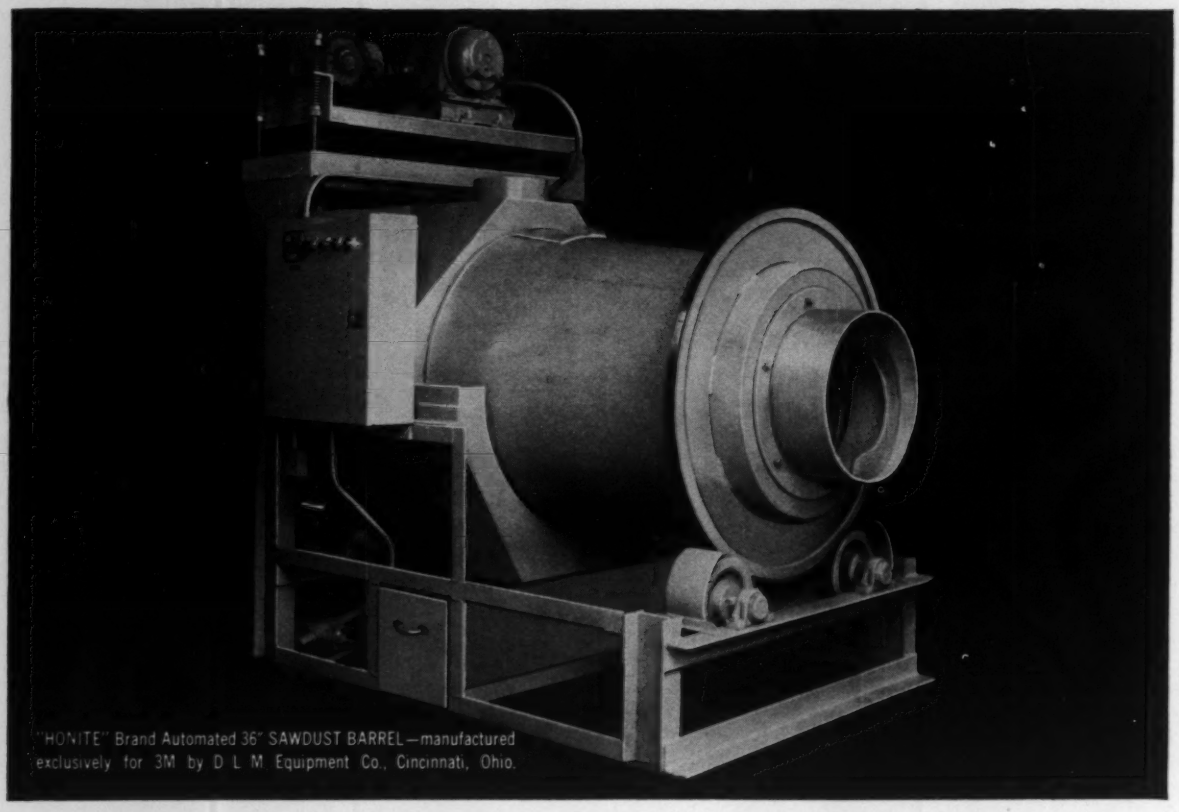
• Bonding several simple aluminum castings to form an engine block.

• Use of structural adhesives for frames made of magnesium or other metals where welding or other joining techniques present problems.

• Because adhesives seal as well as bond, they can provide an answer to economical production of lightweight, leakproof trailer bodies.

Adhesive bonded sandwich construction in floors and other panels can combine high strength with effective insulation qualities, says 3M. It adds: Lightweight metal sheets reinforced with adhesive bonded stiffeners could also help cut weight; sheet metal or sandwich panel side sections could be bonded in channels and sealed in one operation.

NEW FROM 3M



"HONITE" Brand Automated 36" SAWDUST BARREL—manufactured exclusively for 3M by D L M Equipment Co., Cincinnati, Ohio.

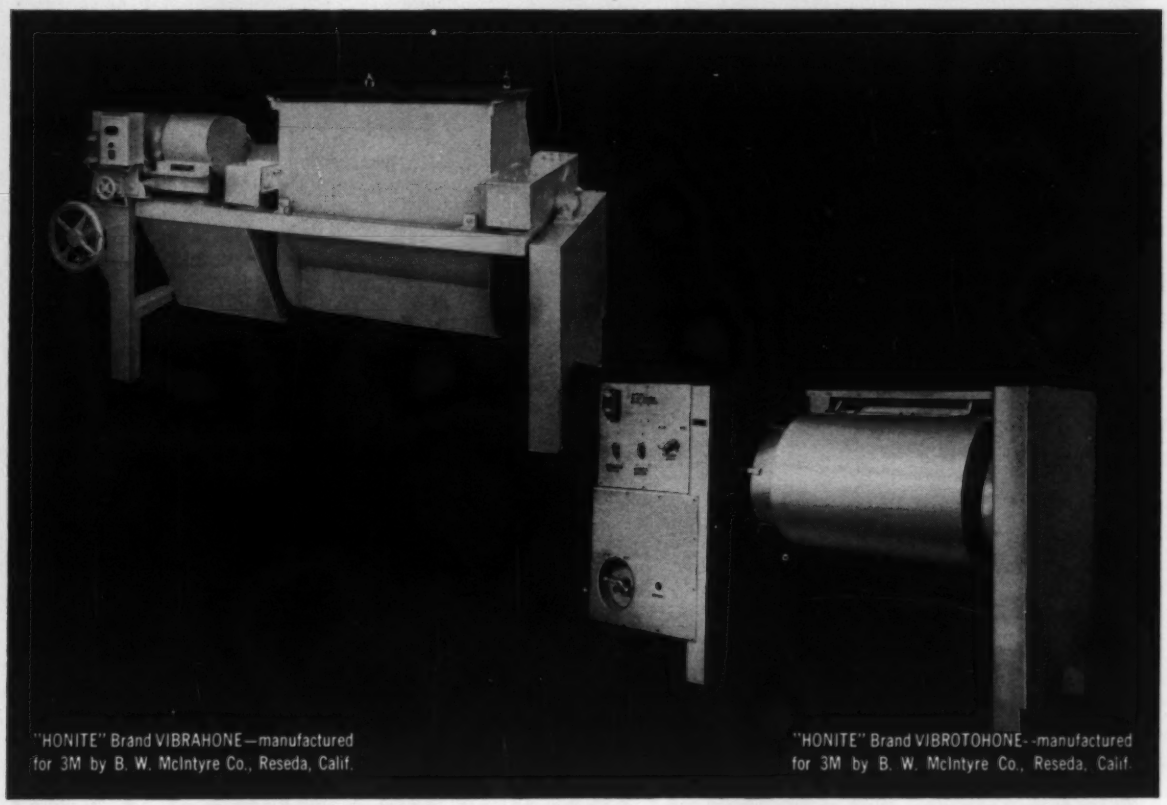
AT LAST, now from one source—3M—a complete line of "HONITE" Brand vibrating, rotating and automated barrel finishing equipment. Choose from more than 100 models, all embodying advanced engineering concepts to insure efficient, trouble-free operation.

AUTOMATED EQUIPMENT Your "HONITE" dealer has access to a completely new facility—one which provides semi-automated or completely automated barrel finishing equipment plus a custom-engineering service geared to plan and install entire systems of automation in your barrel finishing department.

"HONITE" automated equipment may be completely custom-built to suit your needs, or, in some instances your existing equipment may be automated. Standard "HONITE" automated equipment is also available, such as the 36" Sawdust Dryer pictured above. In its completely automated form, this machine performs loading, drying and polishing, media-part separation and unloading automatically.

"HONITE" AND "3M" ARE REGISTERED TRADEMARKS OF THE 3M CO., ST. PAUL 6, MINN.

. . . A COMPLETE LINE OF BARREL FINISHING EQUIPMENT



"HONITE" Brand VIBRAHONE—manufactured for 3M by B. W. McIntyre Co., Reseda, Calif.

"HONITE" Brand VIBROTOHONE—manufactured for 3M by B. W. McIntyre Co., Reseda, Calif.

VIBRATING EQUIPMENT

"HONITE" Brand vibratory equipment features two machines: VIBRAHONE, a tub type vibrator and VIBROTOHONE, a barrel type machine offering three distinct finishing actions —vibration, rotation, and vibration with rotation.

Unlike conventional vibrating equipment, these machines employ no springs but are supported by a revolutionary rubber-mount system. As a result more than 98% of the finishing force generated occurs within the barrel or tub. This is the most concentrated force in barrel finishing.

ROTATING EQUIPMENT

Choose from more than 92 models of the latest in barrel finishing machines—a wide variety of capacities and sizes.

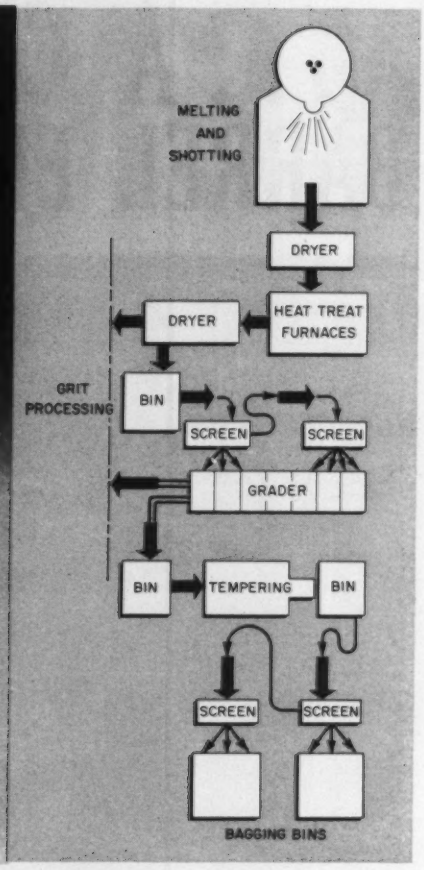
Why settle for partial service on your barrel finishing needs? Now you can get the machines, media and methods from one dependable source. For information or sample processing of your materials, contact your "HONITE" Field Engineer or distributor or write: 3M Co., "HONITE" Division, Dept. HAF-21, 900 Bush Ave., St. Paul 6, Minnesota.

Honite

MINNESOTA MINING AND MANUFACTURING COMPANY

. . . WHERE RESEARCH IS THE KEY TO TOMORROW

3M COMPANY



Shot is cast, carried to processing stations on conveyors . . .

Abrasive Making Gets a Streamlined Look

Product flows continuously to bagging bins

A COMPLETE CHANGEOVER of melting and material handling facilities has given the modern look to shot and grit production at Cleveland Metal Abrasives Co., Cleveland.

An electric arc furnace that turns out closely controlled heats of steel has replaced the company's older melting equipment—a cupola that melted iron for the shotting process. And liberal use of conveyors makes for faster flow of material through the plant.

The 3-ton-per-hour electric was supplied by Whiting Corp., Harvey, Ill.; conveyor equipment was designed and installed by Cleveland Metal Abrasives personnel.

• Molten steel from the furnace is disintegrated by a water stream, to form shot in assorted sizes.

A self-propelled charging car, designed by company personnel, carries a crane type charging box to the scrapyard, where it is loaded by an overhead, magnet crane. The rail car then returns to the melting area.

There an overhead crane lifts the loaded box and charges scrap into the furnace.

After scrap meltdown, the heat is adjusted to the desired steel analysis. Then the furnace is tilted, and the molten metal stream is struck by water under high pressure as it falls toward a large quench tank. The stream of metal disintegrates, and pellets of assorted sizes fall through the water to the bottom of the tank.

• Conveyors carry the shot to a dryer, then to subsequent processing operations.

A conveyor in the bottom of the quench tank carries shot to a bucket elevator that lifts the product from the water and allows it to drain. The product is then dumped into a hopper that feeds a rotating, muffle type, heat treating furnace.

Shot is discharged from the heat treating furnace into a water quench, then passed through a dryer.

Vibrating screens sort the material, rejecting odd sizes and imperfect shapes.

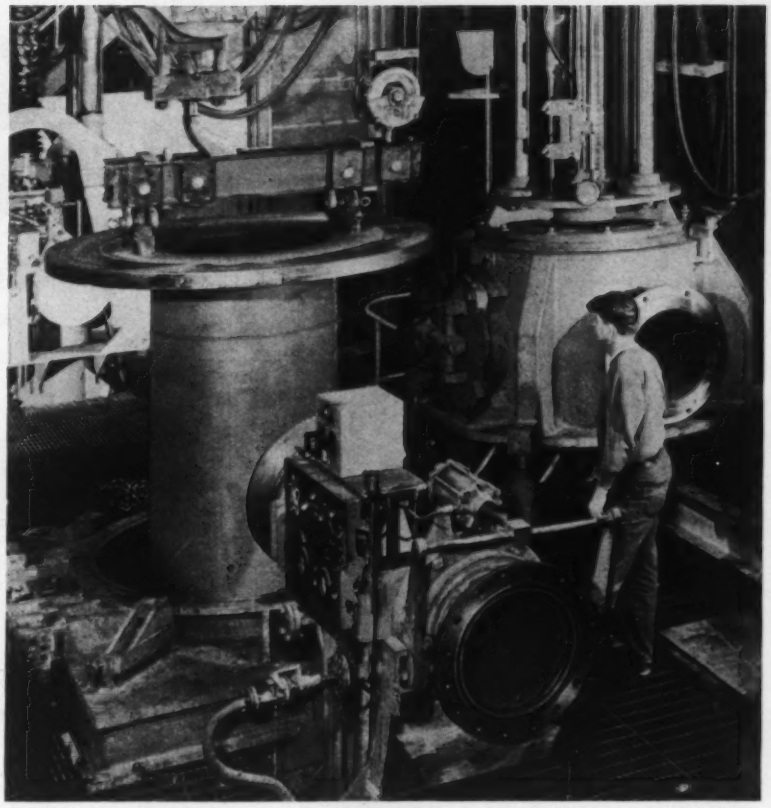
Assorted sizes of shot are carried by conveyor to a continuous draw furnace that tempers the steel. Then the shot is sorted into various sizes by vibrating screens and delivered to the bagging bins. Bags of the finished product are prepared for shipment on pallets in 1 ton lots.

• Some sizes of shot are crushed into grit and graded for size.

Crushed material is recirculated to make the desired sizes. After crushing, the product is screened into standard SAE sizes and tempered to various degrees of hardness.

Final screening insures proper grading.

When requirements for peening and cleaning aren't met by standard SAE grades, the company will supply shot and grit to customer specifications.



Copper crucible is hoisted away as . . .

New, Vacuum Arc Furnace Produces Larger Ingots

LARGER INGOTS of vacuum melted metals are being produced in a new, consumable electrode, vacuum arc furnace at the Watervliet (N. Y.) Works of Allegheny Ludlum Steel Corp.

The unit, built by Lectromelt Furnace Div. (Pittsburgh), McGraw-Edison Co., is the eleventh unit of its type put into commercial production by the steel company.

• The big furnace will make larger forgings and plates of vacuum melted materials available.

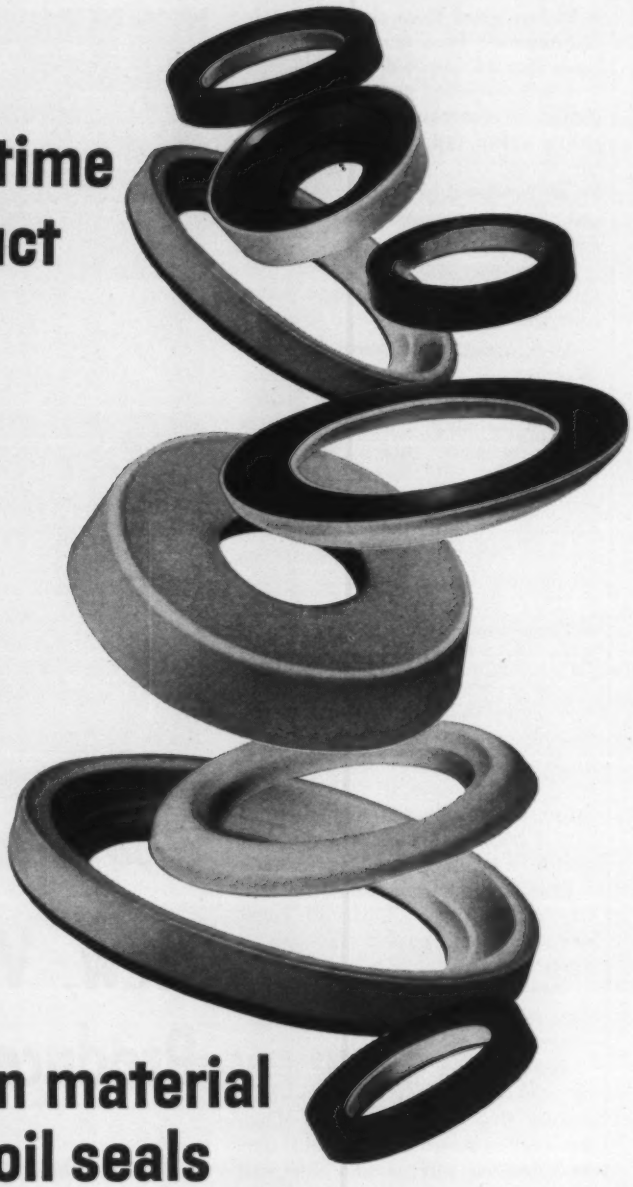
Ingots up to 50 in. in diameter weighing about 60,000 lb are slated for production. In its startup phase, the furnace has made ingots of superalloys and high alloy steels up to 40 in. in diameter.

Larger melts will make for more general application of premium metals in aircraft, missiles, and rockets. Civilian use of the materials is also expected to increase.

• The vacuum process produces cleaner, sounder, more workable steels and alloys; it also improves mechanical properties.

Consumable electrode furnaces produce high alloy metals and close specification, low alloy steels needed for critical applications. They are also used to make ingots of titanium, zirconium, and other metals that require controlled atmosphere for high purity melting.

IPC adds service time to your end product with "RULON"...*



the tested... filled fluorocarbon material for packings and oil seals

IPC now incorporates "RULON"* . . . a *filled fluorocarbon plastic material* . . . in packings, oil seals or precision molded products to answer your most critical sealing problems.

This new combination . . . "custom" molded and bonded for your specific application offers many advantages: Superior abrasion resistance, lower friction, improved sealing, less torque and reduced shaft wear.

Special molding and bonding techniques, developed by IPC for "RULON"* insure long wear and excellent performance. For your critical applications investigate the extras of IPC's latest "custom" approach! You'll find more benefits in handling increased pressures . . . higher shaft speeds . . . and temperature problems too!

**Trade Name of Dixon Corporation.*

IPC

OIL SEALS / PACKINGS / PRECISION MOLDING *Custom designed for your application.*

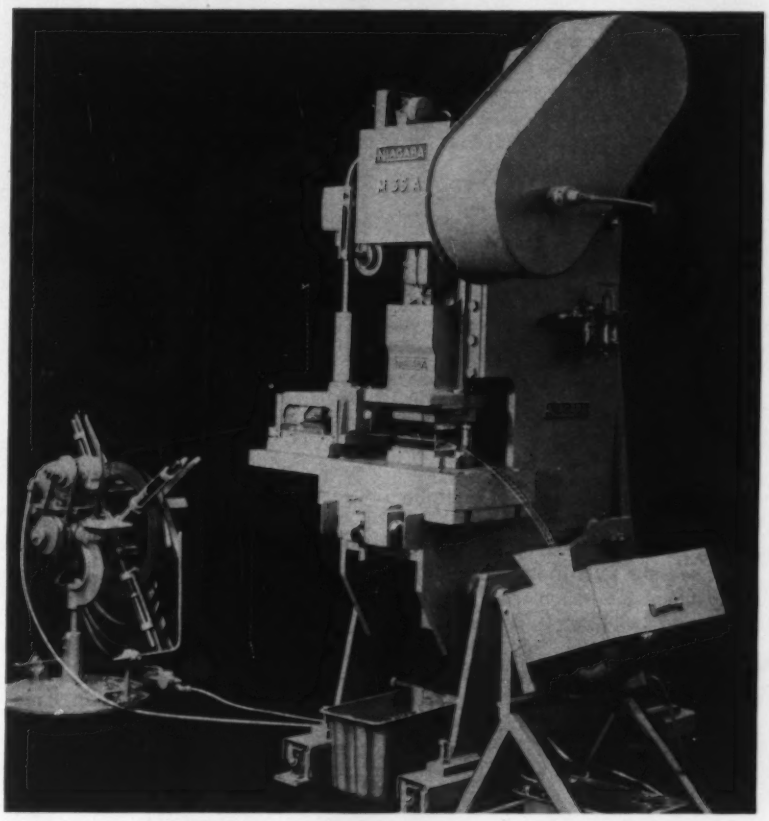
INTERNATIONAL PACKINGS CORPORATION

Bristol, New Hampshire

© IPC

P-2

High Speed Press Can Stamp 1 Million Parts a Day



OPERATING at speeds up to 1000 spm, the 35 ton OBI press shown can produce more than 1 million parts a day. It's one of the Series M, ultrahigh speed press line Niagara says is advantageous for short stroke stamping jobs.

Features include a strong, welded, steel frame; low inertial slide and connection, and nonmetallic ways.

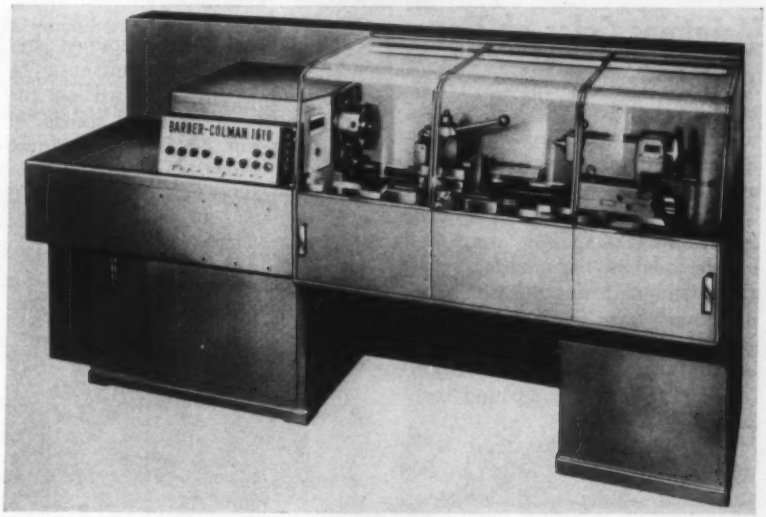
Capacities available: 22, 35, 45, and 60 tons (both nongeared and single geared). Shaft diameters range from 2½ to 4 in. Enclosed drives help provide safer and cleaner press operation.

The slide is designed to meet the requirements of high speed, precision stamping. It is long and rigid to support dies and to prevent deflection of guiding ways.

Any one of three types of lubrication for main and connection bearings and gibs can be provided: 1. Centralized, manually operated, one shot lubricator. 2. Automatic, centralized lubricator. 3. Automatic circulating system.

For further information, *write* Niagara Machine & Tool Works, 683 Northland Ave., Buffalo 11, N. Y.

Discrete Data System on Lathe Simplified



NUMERICAL control's operating advantage has been combined with economy on Barber-Colman's Taper-Guide lathe through elimination of complex equipment, the company says.

The unit (Model 1610) has an integral tape system which actuates (directly from digital data) all mechanical functions required to perform most lathe operations automatically.

Included in the simplified discrete data system (in addition to simple stop-start, positioning, speed adjustment and feed change) is co-ordinated carriage and cross slide actuation necessary for forming simple radiuses and turning tapers. The lathe turns a variety of tapers with-

out hunting, cuts chamfers without special tools, does parting, boring, and internal operations—all automatically from an eight channel, binary code tape in the headstock.

The company says over-all accuracy of the control unit is limited only by the system resolution of ±0.001 in. on diameter and length. In the unit's simplified tape coding system, only one row of tape is needed for a complete axis command. A few rows handle the complete command sequence. It's an incremental system and coding is started from the first operation of the tool rather than from an absolute zero point.

The company says a low cost translator can convert other binary code tapes for the lathe. All operating controls are centralized on the headstock panel, adjacent to the tape reader. Four dials are provided for preselection of spindle speeds (actuated by tape at the proper time in the cycle). Another selector puts the machine into setup mode for incremental jogging of the cross slide or fully automatic cycling. The lathe has swing capacity of 16 and 20 in., infinitely variable spindle speeds to 1200 rpm, and rapid traverse of cross slide and carriage.

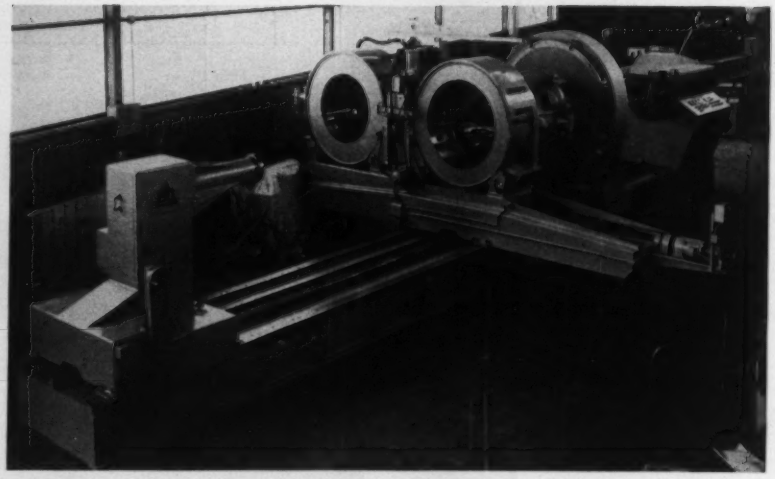
For further information, *write* Barber-Colman Co., 115 Loomis St., Rockford, Ill.

Barrel Finishing Compound Maintains Color of Zinc

A BURNISHING compound (Honite 126) has been devised by 3M to hold better color in barrel finishing of zinc diecastings, steel, and alloys.

Frequently, a small amount of the free flowing, soap type compound can be used in the cutdown cycle; then without rinsing the load, more compound can be added for the burnishing cycle, says 3M. The procedure saves one step in barrel finishing and lowers compound costs, the company adds.

For further information, *write* Minnesota Mining & Mfg. Co., 900 Bush Ave., St. Paul 6, Minn.



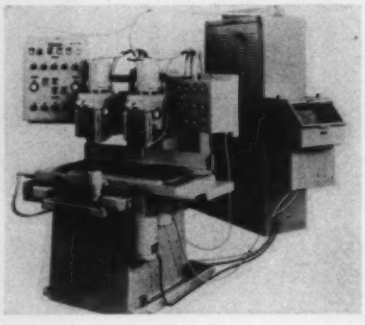
GIRTH WELDING OF ROCKET SHELLS is handled by this welding machine. It's equipped with a cross slide and two cat head assemblies so two different diameters of shells can be welded without changing tooling. Welding equipment is carried on the end of a long boom assembly and both Mig and Tig processes are used. Closed circuit television monitors the weld. The welding head assembly is mounted on a pivoted slide so the unit can go through a 24 in. opening and still reach the bottom of a tank or shell 6 ft in diameter. The machine is 60 ft long, 14 ft high, 23 ft wide, and weighs 54 tons. For further information, **write** Berkeley-Davis Inc., 1021 Bahls St., Danville, Ill.

Tape Guided Unit Drills Complicated Hole Patterns

A TAPE controlled, drilling machine developed by Leland-Gifford produces complicated and precise hole patterns in printed circuit boards.

The machine uses a modified Mark II numerical positioning control (General Electric) with a fast tape reader which can be programed by a Flexowriter or directly from the unit using "artwork" or a sample board.

Up to four self-contained hydraulic feed drilling units can be used (adjustably mounted on the cross rail) to drill at speeds in the range of 50 hits per minute per spindle, depending on the hole spacing. Positioning accuracy is ±0.001 in., nonaccumulative, and with repeatability of ±0.0005 in.



Standard table motion is 15 in. side to side and 11 in. front to back. Front to back motion of 19 in. can be provided if required. Electrical feedback units for both motions give continuous indication of table position.

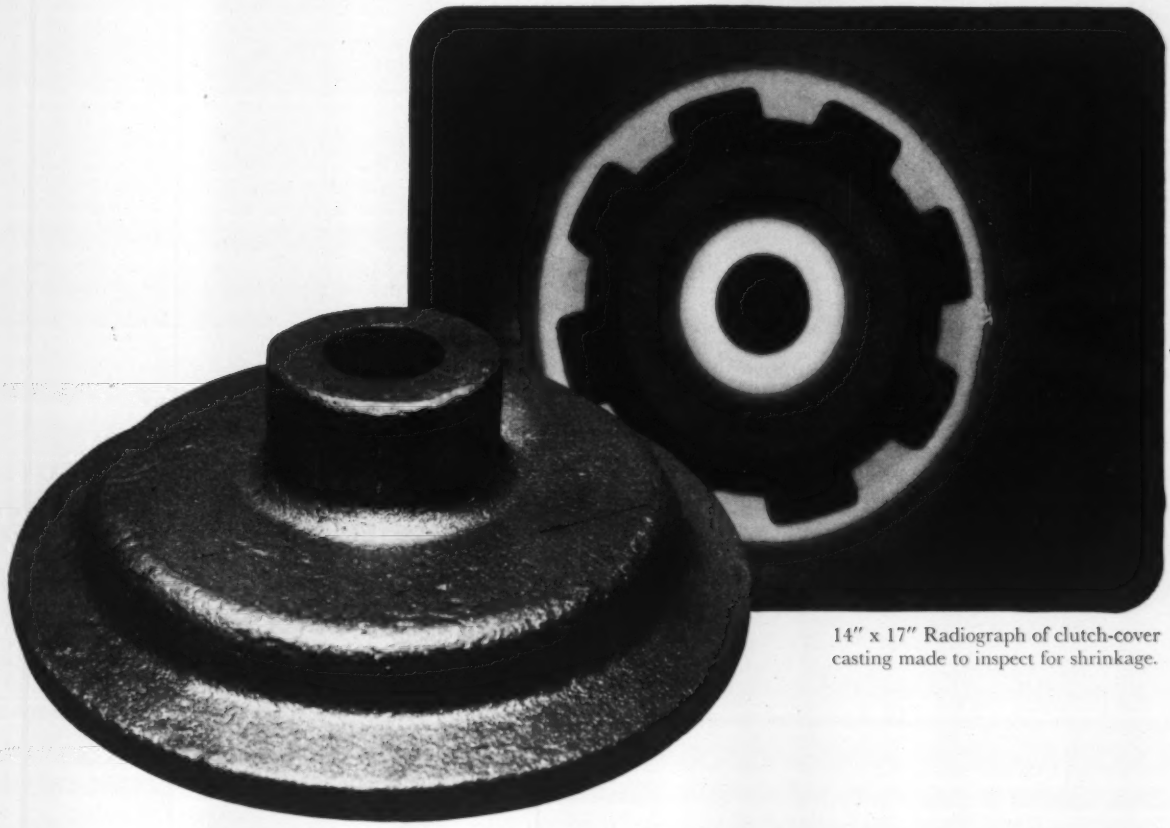
For further information, *write* Leland-Gifford Co., Worcester 1, Mass.

Firm Claims Its Lathe Reduces Time for Jobs

DUAL spindle, economy lathes made by Murray-Way polish, buff, deburr, and brush "in half the normal time," the company says.

Model L12 uses two, separate, motor driven, spindle assemblies mounted on one base. When both wheels are used for the same operation, production is doubled. If one wheel is used for cut-down, the other for coloring, the job can be done with only one fixture.

Each alloy steel spindle is adjustable to compensate for wheel wear. Workwheel speeds may be



14" x 17" Radiograph of clutch-cover casting made to inspect for shrinkage.

The grip that moves mountains must not be broken

Clutches on heavy earth-moving equipment must literally grip with a cast-steel hand. Riverside Foundry, Bettendorf, Iowa, checks the reliability of its clutch-cover castings with radiography.

One of Riverside Foundry's customers makes huge and powerful earth-moving vehicles. Every part must contribute to their stamina—especially the parts that handle the hundreds of horsepower that drive them.

In order to make sure that the castings they deliver are sound and ready for this demanding job, Riverside Foundry of Bettendorf, Iowa, radiographs them, using Kodak Industrial X-ray Film.

This is one of the ways foundries, large and small, are today making certain only high-quality work goes to their customers. They find radiography helps build their reputations and their business.

Radiography can work profitably for you. How? Talk it over with an x-ray dealer or write for a Kodak Technical Representative to call.

NOW . . .
in the NEW Ready Pack . . .
Kodak Industrial X-ray Film,
Type AA and Type M

- No darkroom loading—each sheet sealed in a light-tight envelope.
- Just place Ready Pack in position and expose—film protected from dust, dirt, light and moisture.
- In the darkroom—just pull the rip strip, remove film and process.

EASTMAN KODAK COMPANY
X-ray Division • Rochester 4, N. Y.

Kodak

New weapon
to fight
NATCO
NATCO

profit squeeze

Start profits on the upswing by wringing the water out of drilling, tapping, and milling costs. This new Natco Drilling-Tapping-Milling Machine—with Automatic Tool Changing and Natcotrol—is just the machine to do it.

Virtually eliminate jigs and fixtures, chop parts inventory, hold lead time to hours instead of weeks, cut your scrap rate to the vanishing point, know your costs in advance—these are the kind of savings available to you through Natcotrol—Natco's own fully electro-mechanical numerical control system.

Time wasted at the tool crib? Not any more with Natco's automatic tool changer that works without tool coding, and always holds the next tool ready for quick changing.

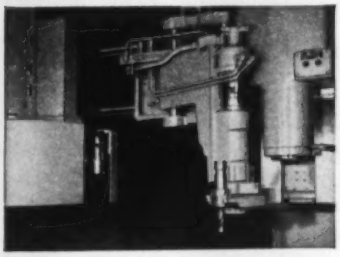
More reasons for putting Natcotrol and the Natco Automatic Tool Changer to work with Natco's powerful new Drilling-Tapping-Milling Machine, cutting your costs and widening your profit margin: Big work area, full numerical control of spindle depth and tool changing as well as table positioning, 50 - 3000 rpm, 2000 lb. thrust, 10 seconds tool changing time, 16" stroke, fast positioning, ±.001" accuracy.

Get us started on a quote for you today. There's a Natco representative in your territory ready to talk business. Write for bulletin No. 157-2.

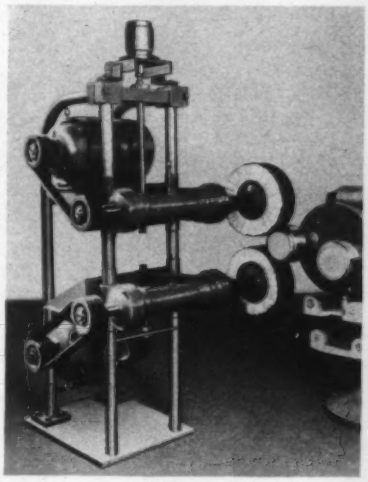
NATIONAL AUTOMATIC TOOL CO., INC.
Richmond, Indiana

NATCO

Changer arm rotates to bring new tool into position. While new tool is operating, tool presenter will index to receive old tool.



NEW PRODUCTS and equipment



varied by changing motor sheaves. The bearings are placed on wide centers for better work pressure distribution and are permanently lubricated. Labyrinth seals are used.

Lock pins hold the spindles stationary for replacement of workwheels. The L12 lathe is about 7 ft high and requires 43 x 34 in. of floor space. Belt guards and cabinets are available.

For further information, *write* Murray-Way Corp., P. O. Box 180, Birmingham, Mich.

Proximity Limit Switches Have 12 in. Sensing Range

TRANSISTORIZED proximity limit switches having sensing ranges up to 12 in. (standard models) can be used with ferrous or nonferrous metals. Cable length for connecting the pickup to the control is not limited. Compensation is provided to eliminate the effects of nearby metals without loss of sensitivity.

You can also get systems with sensing ranges up to ¾ in. on ferrous or nonferrous metals. On strip mills, metal sheets control the proximity limit switch without contact. Delicate materials such as thin aluminum foils can be used without being scratched, bent, or deflected.

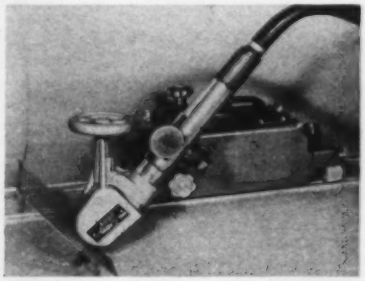
Actuation through barriers without disturbing continuity is possible. Any nonconductive, nonmagnetic material, and some high resistive metals can be sensed without difficulty. Operation in contaminated atmospheres is possible.

For further information, *write* Electronic Signals Inc., P. O. Box 3811, Cleveland 10, Ohio.

Edges of Tough Plates Prepared, Cut by Torch

THE MODEL T-5 torch can prove valuable to heavy fabricators for plate edge preparation or cutting stainless steel and other alloy plates, says the manufacturer. By square butting two plates and gouging along the seam, a smooth, uniform U-groove is produced that in a single operation prepares the edges of both plates. Smooth, straight, fast cuts can be produced when cutting stainless and other alloys. The minimum heat input eliminates warpage or distortion.

The unit can be mounted on a standard cutting machine. It is provided with a 32 pitch rack. Special



pitch racks are available. The operator feeds the carbon-graphite electrodes by handwheel. The desired groove or gouge is easily controlled.

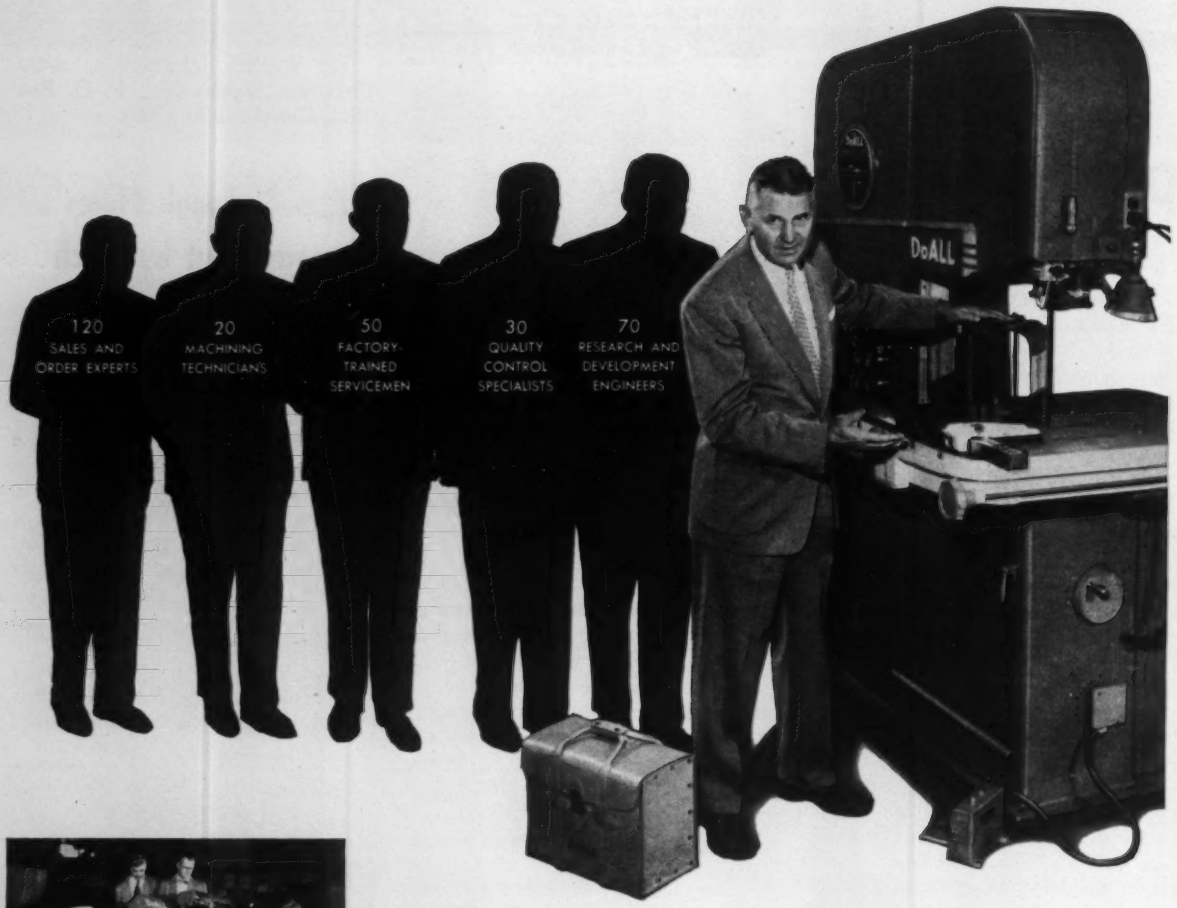
The molten metal is blown away with a jet of compressed air. Shop pressure of 80 to 100 psi is required. The unit uses electrodes ranging from ¼ to ⅝ in.

For further information, *write* Arcair Co., P. O. Box 431, Lancaster, Ohio.

Reversible Belt Splice Joins Interwoven Carcasses

CONVEYOR installations using belts of interwoven carcass may be joined easily and quickly with the heavy duty, hinge type Minet splice.

The need for templates, drilling,



For your evaluation his mobile unit can demonstrate DoALL machines in your plant on your jobs.

Now right at your desk 8 mm. talking pictures show you why DoALL tools and services are best for you.

THE DoALL MAN IS MANY. . .

Your local DoALL metalworking specialist is one of more than 200 trained experts serving American industry. He is backed in depth by another DoALL team of 220 scientific engineers and technicians whose job it is to produce top-quality metalworking tools and keep them operating at peak efficiency in your plant.

Your DoALL specialist has many fresh, thoroughly practical and tested ideas for increasing your productivity. He comes to you with a wealth of experience and a storehouse of knowledge to help you lower the cost of your machining and gaging operations . . . to give you greater productivity.

Through him it is easy for you to solve your metalworking problems. Call him any day—he is at your command and his services are free!

This is a typical DoALL Store

S-11

The DoALL Company, Des Plaines, Illinois

or hole punching is eliminated. The design permits one piece installation to assure the closest possible fit for a tight, leakproof, flexible joint.

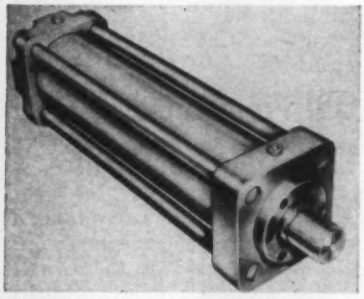
The company points out that the high strength (up to 68 per cent of belt tensile limit) is due to the fastening method which uses pointed rivets which separate, but do not cut and weaken belt fabric. The splice has a heavy duty, re-usable cable pin that can go smoothly around small diameter pulleys.

For further information, *write* General Splice Corp., 32 Woodworth Ave., Yonkers, N. Y.

Four Sizes of Hydraulic Cylinders Run to 150 Tons

A LINE of 10,000 psi, heavy duty, double acting hydraulic cylinders (Series YD) is available in a choice of stroke lengths. Capacities: 50, 75, 100, and 150 tons.

Bore sizes include 3¾, 4½, 5⅛, and 6⅜ in. The units are built for continuous performance—both pushing and pulling. A choice of mountings is offered.



For further information, *write* Precision Hydraulics Div., Owatonna Tool Co., 398 Cedar St., Owatonna, Minn.

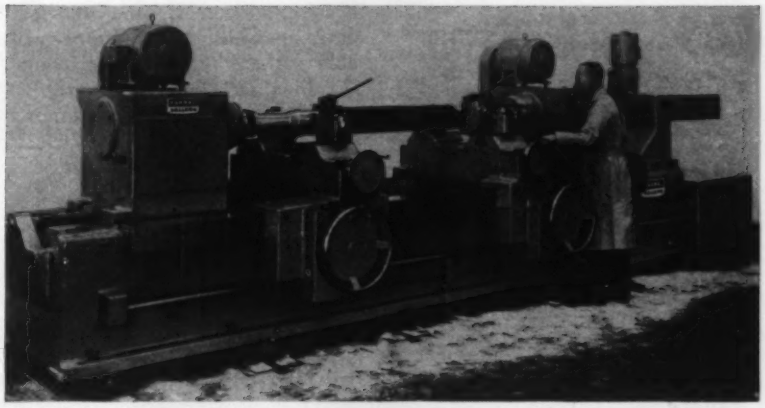
Vacuum Feeder Lifts Sheets From Stack to Machines

METAL SHEETS can be lifted from a stack and fed vertically to a punch press or other similar units. Union Tool's vacuum feeder is designed for that purpose.

Automatic raising arms turn the sheet to the vertical position against powered, magnetic feeder rolls which hold the sheet in the vertical position while feeding.

The unit is supplied with a ¾ hp motor, a variable speed drive, and a complete vacuum system with a 1/3 hp pump for sheet lifting.

For further information, *write* Union Tool Corp., Warsaw, Ind.



YOU CAN TURN PARTS SUCH AS RAILWAY JOURNALS, wheel seats and collars on the Farrel-Sellers lathe. Features include dual end drive, infinite feed increments through a rheostat, adjustable feed increments during cutting, and push-button chucking that does not require the tightening and locking of spindle centers. Magnetic feed clutches permit burnishing with power longitudinal feed. Opposed, equalizing burnishing rolls are provided with radial adjustment for precise alignment of rolls. No coolant is required. Swing over the bed is 49 in. Bed length is 17 ft 8 in. For further information, **write** Consolidated Machine Tool Div., Farrel-Birmingham Co. Inc., 565 Blossom Rd., Rochester 10, N. Y.

Control System for Hoists Uses Static Devices

STATIC devices, circuit symmetry and simplicity, and panel utilization incorporated in a hoist control system reduce maintenance costs, while reduction in the number of collectors helps reduce initial costs, says the maker.

Good speed regulation is obtained without an auxiliary electric load brake. The operator's infinite speed control has been refined to eliminate stepped speed points, application of a safety power limit switch is termed unique, and utilization of control panel components provides convenient circuit test points for maintenance programs.

The system has been thoroughly investigated on a 5 ton test hoist which has a 55 ft lift. The setup is applicable to other drives requiring a reversible adjustable speed system.

For further information, *write* Electric Controller & Mfg. Co., a division of Square D Co., 4504 Lee Rd., Cleveland, Ohio.

Semiautomatic Station Straps 60 in. Coils

A STRAPPING station (the M20-SV) for narrow strip coils uses an M20 power strapping machine head mounted above a roller conveyor table. The suspension system allows fingertip positioning of the power strapping unit. A force of 3½ lb on the adjusting handle positions the machine head anywhere in its 21 in. vertical range and 14 in. of horizontal travel.

The unit will place any number of radial straps on coils as large as 60 in. OD, 24 in. ID, and 16 in. wide, and as small as 19 in. OD, 13 in. ID, and ⅜ in. wide. The unit can handle a maximum coil weight of 4000 lb.

With coil in position, the operator adjusts the unit to the coil width. The strap feeding cycle (controlled with a pushbutton in one adjusting handle) directs the strap down through the coil ID and out toward the operator. He places the strap end in the unit and starts the ten-

sioning cycle with a pushbutton in the other handle. The operator is not required to reach across the coil slit edge to pick up the strap.

The unit is factory adjusted for any one strap width from 3/8 in. through 3/4 in. Strap tension is easily adjustable on the machine, within a range of 50 to 1500 lb. A power driven conveyor and indexing rollers are optional equipment.

For further information, *write* Signode Steel Strapping Co., 2602 N. Western Ave., Chicago 47, Ill.

Control More Accurate on Variable Speed Drives

SPEED RATIOS up to 10:1 at 4 to 10,000 rpm are available on variable speed drives. Type 5 VA, U. S. Varidrive is available in 1/4, 1/3, 1/2, 3/4, and 1 hp sizes (three phase and single phase, 60 cycles).

A new hand control assembly provides more precise settings. The control (operated by a fluted knob) turns with only one-seventh the effort of previous controls. Speed drift is prevented by a positive anticreep device.

The unit is lightweight and compact. Basic features of the larger U. S. Varidrives are retained in the new 5 VA. The unit can be mounted

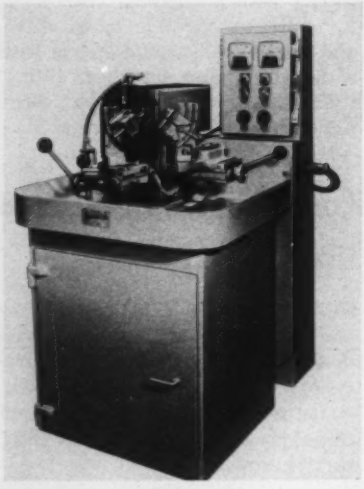
upright, horizontally, shaft up, shaft down, on walls, on ceilings, or available surfaces in or on machines. Combination Type 5 VA Varidrive-Syncrogear motors with internal gearing are also available. The 1/4 hp size is 14 1/2 in. high, 8 1/2 in. wide, and weighs 63 lb.

For further information, *write* U. S. Electrical Motors Inc., P. O. Box 2058, Terminal Annex, Los Angeles 54, Calif.

Electrolytic Unit Speeds Drill Sharpening Task

AN ELECTRONIC drill sharpener (Ampak) can be operated at rates 3 to 7 times faster than conventional units without alteration of the drill metal structure by heat, says the maker.

Complex, special drill points can be duplicated one at a time or on long, uniform, exacting production runs. The control, uniformity, and exacting drill point geometry can extend drill life from 2 to 10 times, says the company.



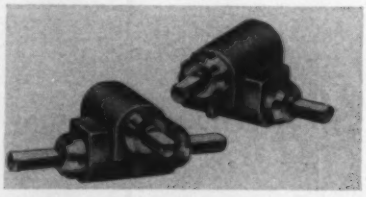
The unit can handle drill point angles from 90 to 180 degrees; lip relief angles from 0 to 20 degrees; and helix angles from 30 degrees positive to 30 degrees negative.

The sharpener has a 1 hp, motorized, 300 ampere, electrolytic spindle; a self-contained 8 volt, 300 ampere, dc power supply; constant electronic voltage regulator; automatic, visual, overload warning system; and self-contained electrolytic fluid systems. Total machine weight is 950 lb. Dimensions are 56 x 38 x 37 in.

For further information, *write* Connecticut Special Machine Inc., Bridge Street, Winsted, Conn.

Capabilities of Drives Include Flexible Shafts

TWO ANGLE drives are provided with 1/4 in. diameter shafts cut to a 1/16 in. flat to provide a stronger attachment for coupling ends. The 9056HF is described as a T-drive and the 9056-119 as a right angle drive.



The units are adaptable to a variety of applications including those with flexible shafting. They have an ultimate static torque capacity of 25 lb-in. with a backlash of 6 degrees. Standard gear ratios are 1:1, 1:2, and 2:1. Others can be specified.

For further information, *write* F. W. Stewart Corp., 4311 Ravenswood Ave., Chicago 13, Ill.

OBI Press Rated at 120 Strokes a Minute

THE OVERLOAD safety factor of an open back, inclinable punch press (30 ton capacity) is 15 per cent.

The pin type, nonrepeat clutch is converted to repeat by switch. The electrically operated unit is rated at 120 strokes a minute. The opening through the back is 12 in. wide. Throat depth is 8 1/2 in. and throat height 12 1/2 in.

The press is operated by a movable foot trip. The ram is held securely by V-type gibs for positive punch and die alignment. Stroke length is 3 in.

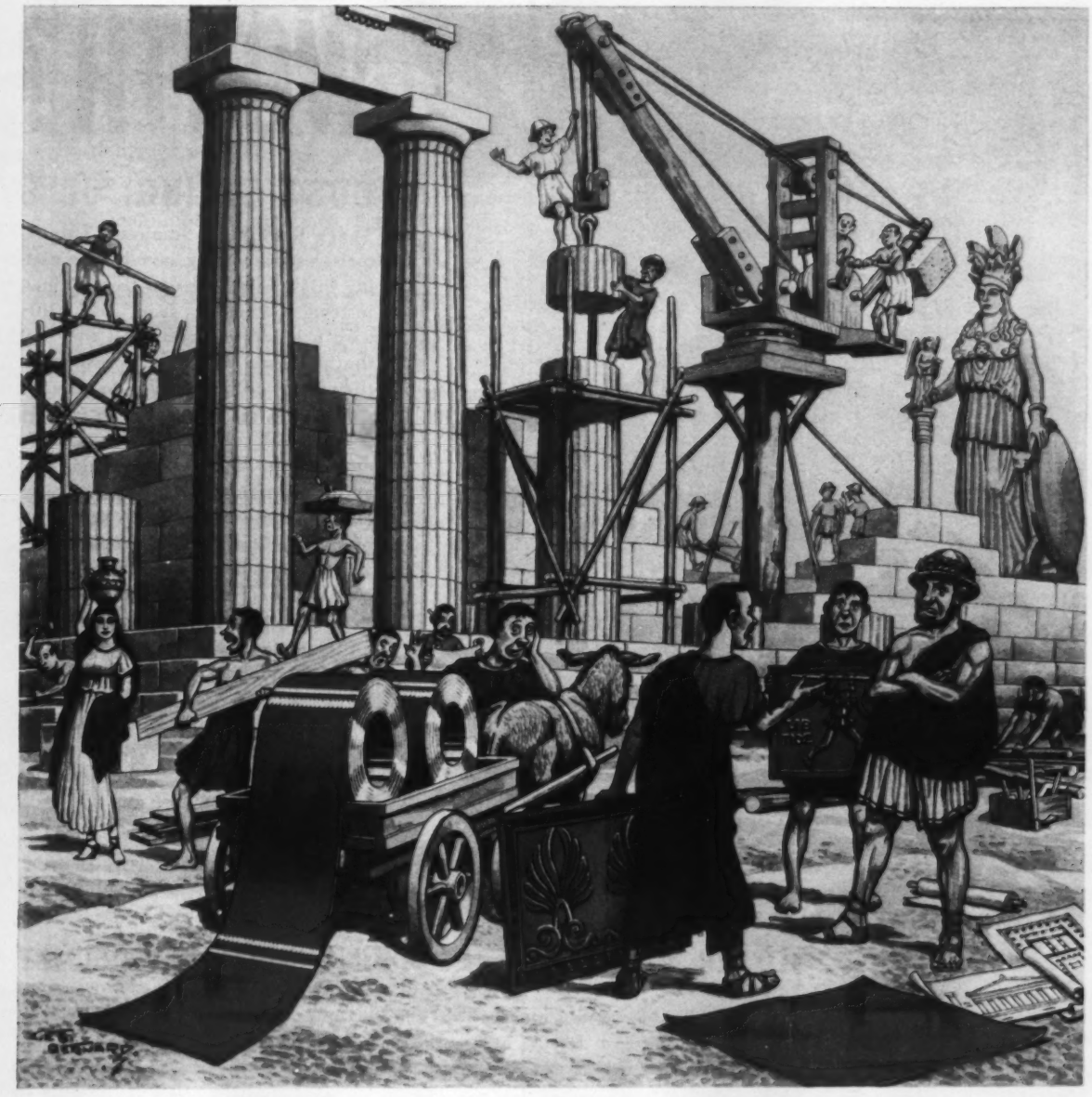
Special optional features include automatic oilers, air operated clutches, and hand operated trip buttons.

For further information, *write* Whitney Metal Tool Co., 801 Forbes St., Rockford, Ill.

Who's to Blame for the Parthenon Mess?

As early as 447 B.C. the young architect, Anacreon, went to see the Parthenon builder, Ictinus, to persuade him to use Washington Steel's ColorRold Stainless Steel as the curtain wall material. But Ictinus, a status quo seeker, obstinately refused.

No wonder the Parthenon now lies in ruins!
As Anacreon said to Ictinus, "Sure, your type of construction may last two or three thousand years, but if you want to build a *permanent* structure you should use Stainless Steel."



There is no substitute for stainless steel whether you are building a skyscraper, a space vehicle or a kitchen sink. Washington Steel's ColorRold Stainless enables you to enhance the beauty of your quality product. *It's a better product if it's made of stainless steel.*

WASHINGTON STEEL CORPORATION
and ColorRold®
PRODUCERS OF *MicroRold®* STAINLESS SHEET & STRIP
WASHINGTON, PA.

are you getting your METAL'S WORTH?

COST SAVING: 60%

That's how much Jamieson Laboratories estimate they save by die casting this blower housing from Zamak instead of stamping from steel. Only with a zinc die casting can they get the rugged ***thin-wall*** construction they need—***tough enough*** to take the shocks and vibration encountered in use, yet with thin-wall sections ***ductile enough*** to take extensive blanking and forming operations after casting. Neither competitive die casting material—aluminum or magnesium—nor the leading injection molded plastics, can meet these demands.

"The design is highly functional and extremely low cost compared to other methods of manufacture," says Jamieson. Can you say that of your own choice of fabrication? Are you getting your metal's worth? Remember—Zamak gives you more for less.

BLOWER HOUSING, WHITECAP AIR-CONDITIONED HELMET
AWARD OF MERIT
The New Jersey Zinc Company's "Zinc Die Casting of The Year" contest
Die Cast by Westland Die Casting Company

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DEVELOPERS OF THE ONLY STANDARD ZINC DIE CASTING ALLOYS IN USE TODAY

HORSE HEAD PRODUCTS

NEW Literature

Write directly to the company for a copy

Air Gaging Techniques

Air gaging principles and applications as well as the equipment available for performing those functions are described in Catalog No. 615. Taft-Peirce Mfg. Co., Woonsocket, R. I.

Fluxes for Aluminum Alloys

How proper use of scientifically compounded fluxes aids foundries and diecasters in the production of superior aluminum castings and helps reduce the number of casting rejects is the subject of an 8 page booklet, "Apex Fluxes for Aluminum Alloys." Photocomparisons of fluxed and unfluxed castings are shown. Apex Smelting Co., 2537 W. Taylor St., Chicago 12, Ill.

Cryogenic Storage Vessels

Storage of liquefied petroleum gases at extremely low temperatures is the subject of a 16 page brochure (G-50). Double wall storage vessels, insulation systems, materials of construction and accessories, are described. Advertising Dept., Chicago Bridge & Iron Co., 332 S. Michigan Ave., Chicago 4, Ill.

Negative-Ion Generators

Booklet CE 860 tells how to build negative-ion generators and how to measure their ion output. Westinghouse Lamp Div., MacArthur Avenue, Bloomfield, N. J.

Water Treatment in Paint Spray Booths

The problems which arise from the use of untreated water, and the properties that water treating compounds should have for the maximum effect on paint overspray, are discussed in a folder, F9443. Tips are given on the proper application procedures and control equipment as well as the regular maintenance of the spray booth system. Oakite Products Inc., 134E Rector St., New York 6, N. Y.

Special Steels Data

Three data sheets describe characteristics and typical applications of five special steels: Heppenstall R97, T51, T71, T72, and T74. Also included are instructions for forging, annealing, quenching, and tempering, together with hardness data and other information. Heppenstall Co., 4620 Hatfield St., Pittsburgh 1, Pa.

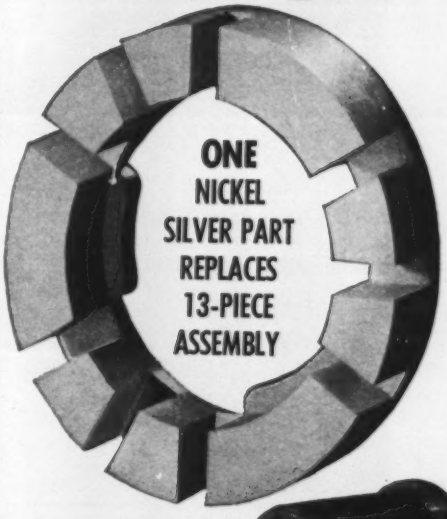
Vacuum Arc Melting Furnaces

A 23 page booklet covers vacuum metallurgy and describes the different kinds of vacuum furnaces and how they operate. Consolidated Vacuum Corp., 1775 Mt. Read Blvd., Rochester 3, N. Y.

Structural Aluminum Design

A 232 page book covers calculations for load carrying members of aluminum. Dept. PR-42, Reynolds Metals Co., Richmond 18, Va.

METAL POWDERS CUT COSTS $1.97 per piece



INGENIOUS DESIGN SAVES 95% AND CUTS ASSEMBLY TIME FOR STATOR WINDING AT MINNEAPOLIS-HONEYWELL

Formerly, 13 pieces were machined from brass bar stock and fitted by hand to a plastic ring to provide contact points for this assembly.

TOTAL COST WAS $2.07

CONVERTING TO NICKEL SILVER POWDER, ***ONE PIECE,*** DELIVERED BY THE FABRICATOR* READY FOR ASSEMBLY, IS EMBEDDED IN PLASTIC, THEN CUT BACK TO EXPOSE THE ACCURATELY-PLACED TERMINALS — COST 10¢.

*Sintered Metals, Inc., Boston.

It's New!

"DESIGNING FOR PRESSED BRASS AND NICKEL SILVER METAL POWDER PARTS"

WRITE FOR YOUR COPY — it will give you many valuable suggestions for designing parts to obtain the greatest advantages, including economy, for your products.

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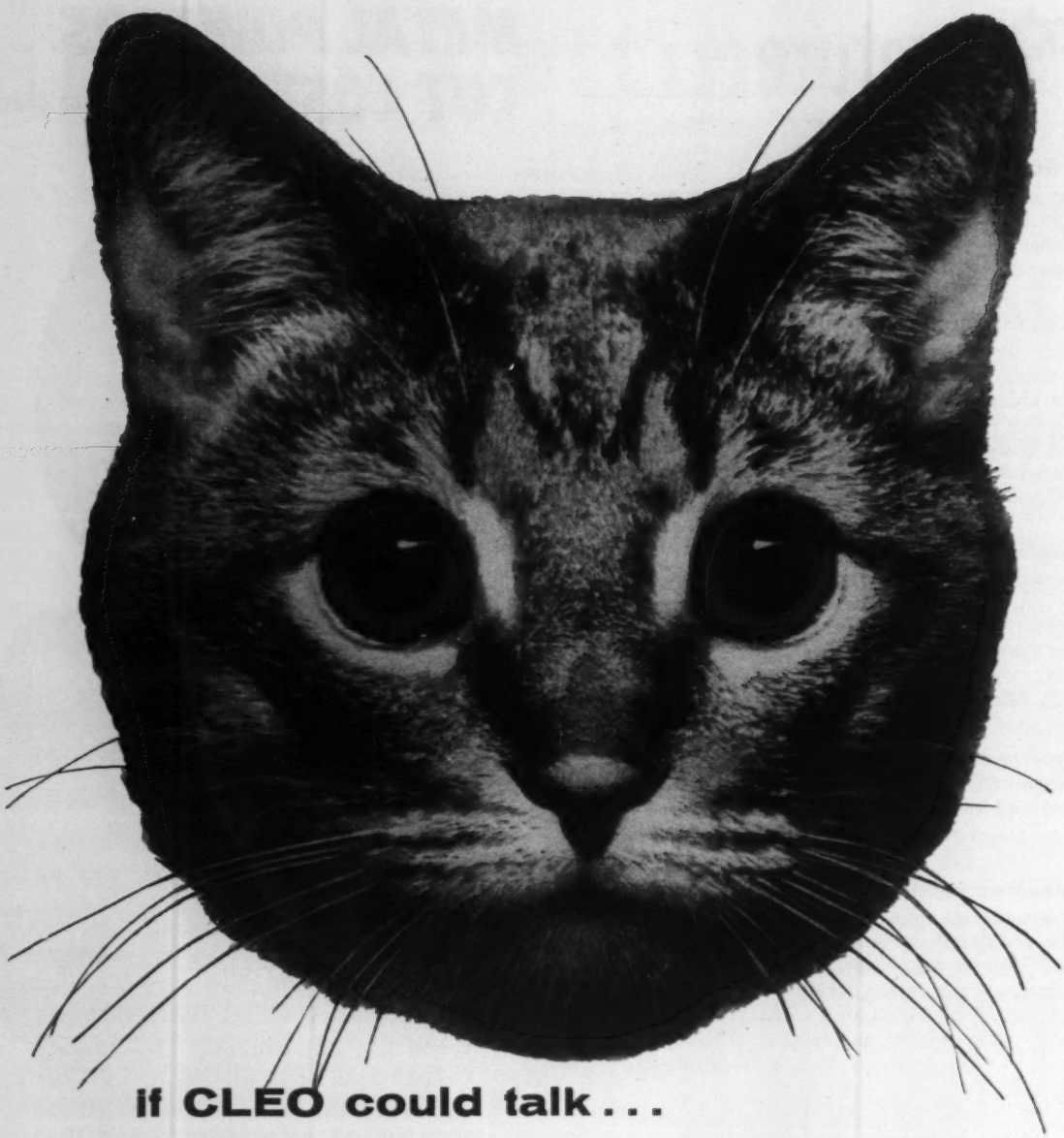

if CLEO could talk . . .

This is Cleo, a cat who makes her home near the secure warmth of our billet furnace.

Cleo is an eye witness to almost every operation in our plant. Day and night, she sees the relentless effort of our "men of steel" to produce steel of quality . . . men who are qualified not only by years of experience in the production of high quality steel for cold heading and nut formations, but also by a keen CONSISTENT interest to maintain quality . . . and to give every order, regardless of quantity, the *same* special attention.

There are a number of sources for bars and rods, but if CLEO could talk to YOU . . . you'd call Seaway next time you order!

Ask us about a delivery date on your next order! NX 3-9700

SEAWAY STEEL CORPORATION

101 EAST AVENUE • NORTH TONAWANDA, NEW YORK

Slow Consumption Delays Upswing

REDUCED ACTIVITY in metalworking is making steel inventories stretch farther, allowing buyers to postpone placing new orders.

Steel consumption has fallen steadily since early last year. Market analysts estimate that users consumed about 19.7 million tons in the first quarter of 1960, 19.3 million tons in the second quarter, 17.2 million tons in the third, and 16.9 million tons in the fourth.

They believe consumption in the first quarter of 1961 will be only 16.6 million tons—15 per cent less than it was in the like quarter of 1960. To explain the falloff, they don't have to look much farther than the automotive industry. A year ago, the car companies were turning out new models at a record rate—nearly 700,000 a month—as they labored to make up production losses resulting from the 1959 steel strike. This month, they probably won't build more than 425,000. They're facing a problem of the opposite kind—too many cars have been built already. Dealer inventories are at an all-time high for the season.

OTHER MARKETS LAG—The slowdown in steel use isn't all automotive, of course. Business has also fallen off in heavy apparatus, machine tools, railroad equipment, and shipbuilding. And with unemployment up, spending for consumer durables lags.

More than autos, the capital goods industries hold the key to steel demand. When spending for plant and equipment is up, there's usually high employment and a strong market for durables. For proof that steel can do well when autos don't, remember this: In 1956, when only 5.8 million cars were built, steel ingot production was 115.2 million tons—second highest in history. In 1953 and 1957, years when 6.1 million cars were produced, ingot output was in excess of 111 million tons. (Last year, auto output was 6.7 million, but steel production was only 99.3 million tons.)

HARSH WEATHER HURTS—Storms that swept much of the nation in late January and early February also contributed to the drop in steel consumption. Heavy snows in the East snarled transportation, delayed shipments, and slowed plant operations. They brought construction, mining, quarrying, and other outside activities almost to a standstill. Finally, they kept potential new car buyers out of dealer showrooms. Result: January sales were the lowest in several years.

TAPERING OFF—But in spite of the reduced consumption, it's apparent that inventory liquidation can't go much farther. Commercial research experts predict a reduction of about 1.2 million tons in this year's first quarter (vs. 2.8 million tons in the fourth quarter of last year).

Service centers have cut their stocks to 3 million tons—150,000 tons less than they had at the first of the year—says Robert G. Welch, executive vice president, Steel Service Center Institute, Cleveland. He believes that liquidation has ended but admits that inventories dropped more than he expected.

UPTURN IN CHICAGO—Although there's no departure from the sidewise business trend in most of the country, modest gains are being recorded in Chicago. At some mills, orders are being entered at the best rate since August. There's a chance that February sales will exceeed last month's.

PRODUCTION HOLDS—Ingot output in the week ended Feb. 18 will probably be close to the 1.5 million tons that STEEL estimates the industry produced in the week ended Feb. 11. (Output then was 0.5 per cent above the 1,492,000 tons poured in the week ended Feb. 4.)

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*Current prices were published in the Feb. 6 issue and will appear in subsequent issues.

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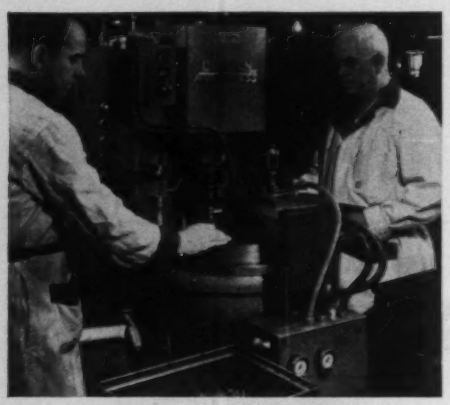
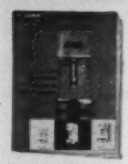
DENISON HydrOILics

How **STEWART-WARNER** produces 220 different assemblies on one **DENISON** Multipress and saves...

MONEY





THIS NEW SERIES "R" MULTIPRESS *assembles 220 different assemblies and prepares them for brazing at Stewart-Warner Corp., Chicago. Write for free Bulletin 324—New "R-S-T" Series Multipress.*

COST-SAVING versatility was a key requirement on this pressing job. To produce assemblies for a new product line, Stewart-Warner's Alemite Division needed a press set-up that could handle up to 220 different assemblies. And because of the short runs involved, fast changeover with minimum downtime was a must. *Installation of just one Denison hydraulic Multipress filled the bill.*

This Denison Series "R" 6-ton bench press, equipped with automatic index table and special "quick-change" tooling, assembles from 600 to 850 assemblies per hour. Finished parts are uniform, high-quality . . . *no rejects.* And tooling changes can be made in minutes to accommodate the full range of 220 different types and sizes.

A unique feature of this operation is an adjustable applicator mounted on the index table that automatically applies a metered amount of brazing compound to each two-piece assembly. It completely eliminates a former hand operation—*and does the job better.*

What's *your* problem? Ask the nearby Denison Production Specialist about a **M**ultipress **A**nalysis **P**rogram in your plant now. It can **MAP** new ways to cut your costs, get better quality finished products.

DENISON ENGINEERING DIVISION
American Brake Shoe Company
1180 Dublin Road • Columbus 16, Ohio

HYDRAULIC PRESSES
PUMPS • MOTORS • CONTROLS

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HYDRAULIC MULTIPRESS

Bright Annealing's Explosive Growth

Annual capacity for processing stainless strip may reach 400,000 tons by the end of the year. Here's what leading producers have and what they're planning to add:

Company	Plant Site	Number of lines	Max. Width (Inches)	Startup	Capacity (Tons per year)
Allegheny Ludlum Steel Corp.	West Leechburg, Pa.	1	27	October, 1960	18,000
Wallingford Steel Co.	Wallingford, Conn.	1	12	1949	3,000
		1	25	1955	6,000
		1	27	September, 1960	18,000
American Steel & Wire Div., U. S. Steel Corp.	Cleveland	1	36	June, 1961	27,000
Armco Steel Corp.	Butler, Pa.	1	15	1951	3,600
		1	22	1956	8,400
Crucible Steel Co. of America	Harrison, N. J.	1	12	February, 1961	N.A.
	Midland, Pa.	1	48	July, 1961	N.A.
Wilbur B. Driver Co.	Newark, N. J.	1	12	February, 1960	N.A.
Hamilton Watch Co., Metals & Electronics Div.	Lancaster, Pa.	1	8	1949	N.A.
		1	14	February, 1960	N.A.
Jones & Laughlin Steel Corp.	Youngstown	1	12	N.A.	N.A.
McLouth Steel Corp.	Detroit	1	48	July, 1961	45,000
Rodney Metals Inc.	New Bedford, Mass.	1	25	1953	1,750
		1	13	April, 1961	875
Republic Steel Corp.	Massillon, Ohio	1	24	April, 1961	18,000
Seymour Mfg. Co.	Seymour, Conn.	1	18	1959	750
Sharon Steel Corp.	Farrell, Pa.	1	24	February, 1961	18,000
Somers Brass Co.	Waterbury, Conn.	1	14	1947	600
		1	14	1951	600
		1	24	1959	3,000
Superior Steel Div., Copperweld Steel Corp.	Carnegie, Pa.	1	18	1954	3,600
		1	24	March, 1961	18,000
Texas Instruments Inc., Metals & Controls Div.	Attleboro, Mass.	1	12	February, 1961	N.A.
Ulbrich Stainless Steels	Wallingford, Conn.	1	14	1957	1,350
		1	5	April, 1961	450
Washington Steel Corp.	Washington, Pa.	1	48	June, 1961	45,000

N.A.=not available.

Stainless Makers Map Market Push

LOOK FOR a dynamic year in stainless steel in spite of so-so shipments.

The biggest news will be in technology—the industry's headlong flight to bright annealing. You can also expect big events in sales: All-out promotion of stainless consumer goods, new uses in autos, important gains in architectural markets, and a promising revival in manned aircraft.

Shipments (including heat resisting steels) will probably be about 570,000 tons, approximately the same as last year's and equal to the yearly average since 1957. They could go above 600,000 tons if: 1. There's a pickup in industrial markets. 2. New cars sell better than expected. 3. Users start rebuilding their inventories toward the end of the year in preparation for a possible steel strike in 1962.

• **More Bright Annealing**—The big switch to bright annealing started

about a year ago in response to the auto industry's demand for a stainless product with better corrosion resistance. Type 430 stainless, annealed and pickled in the conventional manner, wasn't standing up against the salt spray corrosion tests that automakers adopted. To solve the problem, Wallingford Steel Co., Wallingford, Conn., tried bright annealing—protecting the strip from oxidation by annealing it in a controlled atmosphere (hydrogen or dissociated ammonia). Since no oxides formed during the heating cycle, there was no subsequent need for pickling—a process that restored brightness but depleted surface chrome, making the strip less resistant to corrosive attack.

The process is as successful for automotive strip as it has been for the ultrathin stainless used in aircraft, missiles, instruments, electronic equipment, and jewelry.

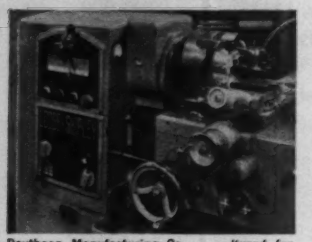
Automotive suppliers were delighted because the new product cost no more than regular stainless (Type 430), retained its bright finish after stamping, and didn't require a lot of buffing. Soon they were ordering all the material they could get. Wallingford installed a new furnace, upped its capacity, and substantially increased its share of the automotive strip market. Its parent, Allegheny Ludlum Steel Corp., took the hint and installed a furnace of the same type at its West Leechburg (Pa.) works.

● **Capacity May Double**—Then the scramble began. Other steelmakers, fearing the loss of hard-won automotive business, ordered furnaces. "At the end of 1960, there was enough installed capacity to give a single anneal to about 200,000 tons of bright annealed stainless strip per year," estimates R. W. Kise, manager of marketing, Industrial Heating Dept. (Shelbyville, Ind.) of General Electric Co. He expects capacity to double during 1961. Adds F. T. Cope, vice president of sales, Electric Furnace Co., Salem, Ohio: "Most of the companies that have bought one unit are contemplating the purchase of at least one more."

● **Heavy Promotion**—To stimulate the purchase of stainless housewares, International Nickel Co. will launch its third successive "gleam of stainless steel" promotional program next week. Scheduled to run from Feb. 20 to Mar. 10, the campaign will involve 61 major U. S. department stores with 141 outlets. Fifty-one stores are planning to set up stainless steel shops, and at least 35 will retain them on a permanent basis. They pay off, says Macy's, New York. Since putting in a stainless center 18 months ago, the store has doubled its sales of flatware and tripled its sales of hollow ware.

● **Stainless Mufflers**—The recent decision by Ford Motor Co. to install stainless mufflers on its 1961 Thunderbirds (STEEL, Jan. 16, p. 51) opens the door to a potentially sizable market. If Ford makes as many Thunderbirds this year as it did in 1960, it will require about 610 tons of MF-1, a new stainless grade developed by Allegheny Ludlum. STEEL's sources say Ford is weighing the use of stainless mufflers on all V-8 engines with a displacement of

Dalmotor Div., Yuba Consolidated Industries . . . "used in model shop for turning, facing and boring all sorts of experimental parts."

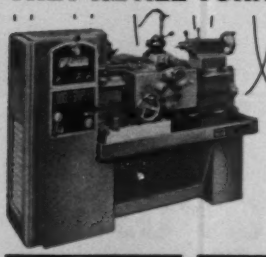


Raytheon Manufacturing Co. . . . "used for turning, facing and boring operations on brass, aluminum and steel workpieces."

Over an extremely wide range of American industry . . . for tooling, production, maintenance and experimentation . . . the Lodge & Shipley 1307 HI-TURN (10") Lathe is making a record of true economy. With literally dozens of big lathe features, the HI-TURN is still priced substantially below many lathes having fewer features, less horsepower and lighter construction.

Turn your attention to HI-TURN. Find out why these and many other lathe users are ordering and reordering HI-TURN Production and Tracer Lathes to replace or supplement larger, far more costly lathes. For complete details, request Bulletin 331, The Lodge & Shipley Co., 3070 Colerain Ave., Cincinnati 25, Ohio.

THEY'RE ALL TURNING TO Hi-Turn



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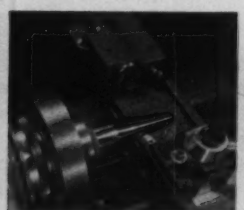
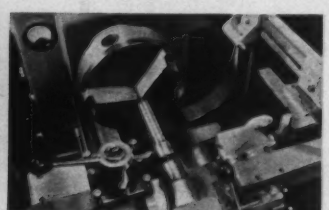
Rocketdyne Div., North American Aviation . . . "held OD turning to a tolerance of .0003" "



Anchor Hocking Glass Corp. . . . "unheard of economy, ease and speed of production" on machining and reworking glass bottle tooling.



Indiana Gear Works . . . has earned a reputation of "excellent for high production."

more than 292 cu in. But Ford won't move in that direction until it has other sources of supply. If stainless mufflers were adopted by all automakers, it's estimated that there would be a 40 per cent increase in automotive use of the bright metal.

• **Stainless Planes**—After spending $317 million on development of the B-70, the Pentagon is moving ahead with production of two prototype aircraft. They'll be 80 per cent stainless—each containing about 84,000 lb of the metal. The first flight tests are scheduled for 1963. If the Air Force gets its way, it may order 20 to 30 of the planes over the next few years. Modified for commercial use, the B-70 may be the supertransport of 1968.

• **Brighter Future?**—In the last five years, stainless has gained in some fields, lost in others. It hasn't shown any over-all growth. Producers look for an upward trend in the sixties that will be spurred by new family formations and more disposable income. International Nickel Co. predicts that by 1967 stainless shipments will reach 1.1 million tons a year—double last year's and four times those of 1947.

Eastern Steel Mills Feel Impact of Severe Storms

Eastern steel mills report their shipping schedules are slowly recovering from the impact of heavy snows that snarled transportation and communications, slowed plant operations, brought building construction, mining, quarrying, and other outside activities to a virtual halt.

The storms complicated the problem of plant maintenance over a wide and diversified area. Continuation of the unusually severe weather also adversely affected demand for steel, especially in the construction field. It also retarded early interest in the purchase of new automobiles.

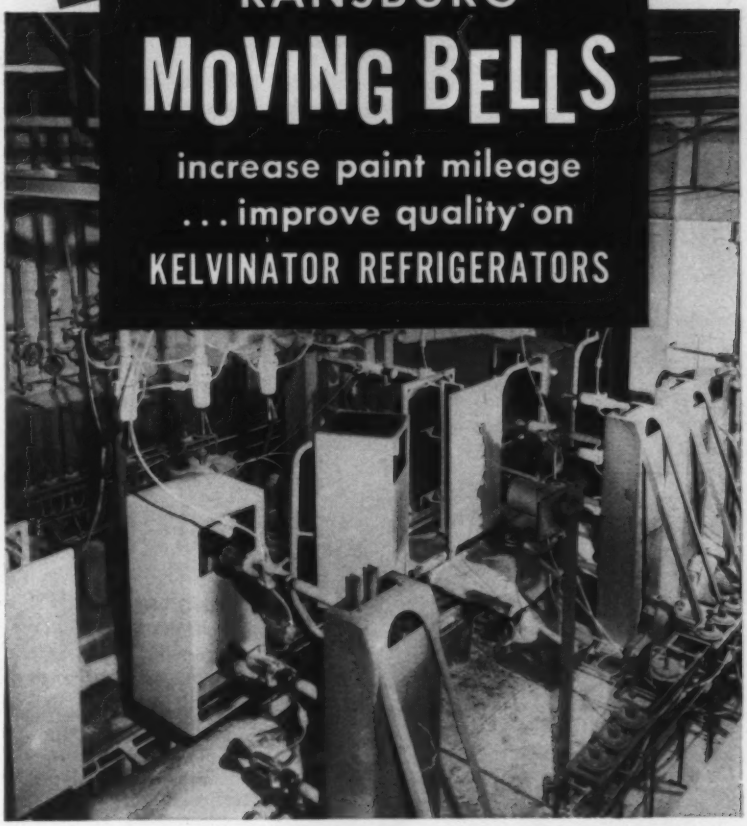
Once the weather moderates, demand for steel is expected to accelerate with the industry benefiting in some degree by larger orders resulting from the loss during the period of the storms. Also, steel requirements for maintenance and repairs

NEW

RANSBURG

MOVING BELLS

increase paint mileage ... improve quality on KELVINATOR REFRIGERATORS



Ransburg's No. 2 Process moving bells—latest innovation in electrostatic painting—automatically paint mixed sizes of refrigerator cabinets and doors on Kelvinator's new finishing line.

On this job—first of its kind—limit switches re-position the reciprocating bells to accommodate various model sizes mixed on the same line. And, electric eyes selectively trigger the paint on and off between parts.

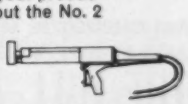
RESULTS? Automatic electrostatic spray painting—which replaced a battery of reciprocating automatic air guns—is providing Kelvinator with a beautiful, higher quality, and more uniform finish. Rejects, formerly a troublesome problem, have been practically eliminated. And, along with appreciable labor savings in this highly automated set-up, paint mileage is substantially improved . . . even bettering the savings indicated in pre-installation lab tests at Ransburg.

Like Kelvinator, other manufacturers of quality products will find Ransburg's moving bells the automation answer for production lines where batching of similar parts is impractical.

NO REASON WHY YOU CAN'T DO IT, TOO!

Want to know how Ransburg No. 2 Process can improve the quality of YOUR painted products—and at the same time—cut YOUR paint and labor costs? Write for our No. 2 Process brochure. Or, if your production doesn't justify automatic painting, let us tell you about the No. 2 Process Electrostatic Hand Gun which can be used in either conveyorized, or non-conveyorized painting.

RANSBURG



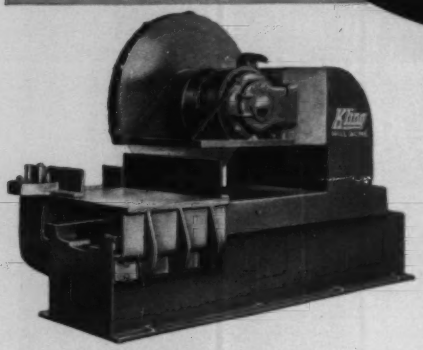
RANSBURG Electro-Coating Corp.

Box 23122, Indianapolis 23, Indiana

Kling

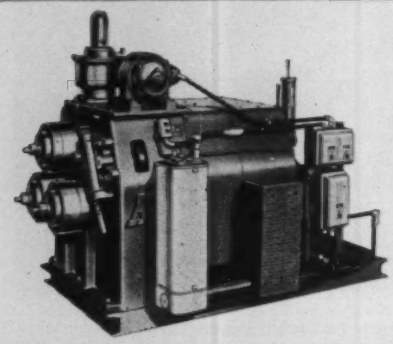
METAL WORKING TOOLS

Representative items of a full line



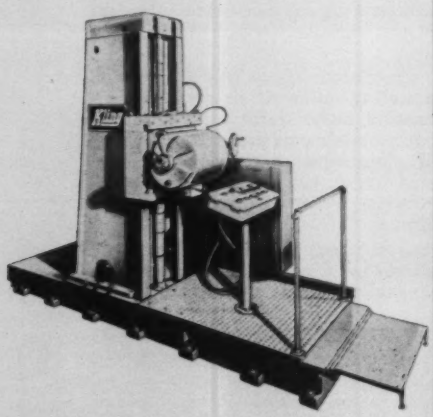
"KLING" FRICTION SAWS

Permit faster cutting of varied structural shapes as well as solid or hollow bars in any sequence without changing the blade or set-up. Made in several sizes and models for high speed production operations. (Bulletin 4200)



"KLING" NO. ½-A PYRAMID ANGLE ROLL

For forming angles, channels, beams, bars (on edge or flat) with self feeding feature and heavy guide rolls to prevent twisting. Available in a wide range of machine sizes and capacities. (Bulletin AR-600)



"KLING" STRUCTURAL MILL

For face milling of steel sections, plates, forgings and castings up to 60" per minute. Will handle the largest work pieces. 30 HP, 40 HP or 75 HP milling motor and simplified controls permit fast metal removal. (Bulletin MA-1)

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may be heavier than usual for some time as result of storm damage.

Ferroalloys . . .

Ferroalloy Prices, Page 162

Prices on all grades of the regular and nitrogen bearing, low carbon ferrochrome were reduced 2 cents a pound by Union Carbide Metals Co., New York, effective with shipments Jan. 25. The company, a division of Union Carbide Corp., announced that the revision puts the prices on those grades in relative balance with those of the high carbon grades.

New base prices per pound of contained chromium of the regular and nitrogen bearing grades, carload lots of lump material in bulk:

Regular Grades: Chromium 68-73 per cent, silicon 0.20-100 per cent, max 0.025 per cent carbon, $0.3300. Chromium 65-71 per cent, silicon 0.30-1.00 per cent, max 0.05 per cent carbon, $0.3200; max 0.10 per cent carbon, $0.3175; max 0.20 per cent carbon, $0.3150; max 0.50 per cent carbon, $0.3125; max 1.00 per cent carbon, $0.3100; max 1.50 per cent carbon, $0.3075; max 2.00 per cent carbon, $0.3050.

Nitrogen bearing Grade: Chromium 65-70 per cent, silicon 0.30-1.00 per cent, nitrogen 0.75 per cent approximately, max 0.10 per cent carbon, $0.3675.

Union Carbide Metals Co., is recalling 70 employees at its Ashtabula, Ohio, Works. Fifty more will be recalled Feb. 20.

Sheets, Strip . . .

Sheet & Strip Prices, Pages 156 & 157

New sheet buying is largely of a rush character, reflecting the low state of many consumers' stocks. Indications are that cold rolled sheet business won't be as good this month or next as it was in January.

Automotive pushbacks of shipments this month and next have hit cold rolled sheets hard. Until there is a reversal in the passenger car assembly trend, there's not likely to be much strength in sheets.

Sheetmakers are encouraged a little by the situation in the household appliance field. Although refrigerator output is lagging at a time production normally increases, activity is reported rising in other appliance areas, notably in the laundry equipment segment.

Steel Bars . . .

Bar Prices, Page 154

Carbon bar demand continues slow, and immediate prospects are not promising. Converters, railroads, fastener manufacturers, serv-

ice centers, and makers of agricultural equipment are all specifying lightly.

Most bar mills don't anticipate much change in the market situation before late March. Deliveries show no sign of early stiffening, except for tonnage in transit that's slowed by bad weather.

Reinforcing Bars . . .

Reinforcing Bar Prices, Page 156

Seasonal slackness in construction is reflected in a sluggish movement of reinforcing bars and other building steel items. However, sellers anticipate a pickup in ordering within a month as spring nears and buyers begin to prepare for their summer campaigns, especially public jobs.

Plates . . .

Plate Prices, Page 154

Plate business continues sluggish, but some pickup in Navy requirements is reported. An Eastern mill has just booked 1800 tons, including 400 tons of high tensile material. Demand from the chemical industry for pressure vessels and tanks is helping sustain the market, especially in specialties and stainless clad. Some stainless clad fabricators estimate an improvement of 8 to 10 per cent in business this year.

In the Midwest, while demand is not strong, it is diversified in character, and includes material for line pipe as well as for freight car construction and repairs. The outlook in the farm equipment field continues fairly promising.

Tubular Goods . . .

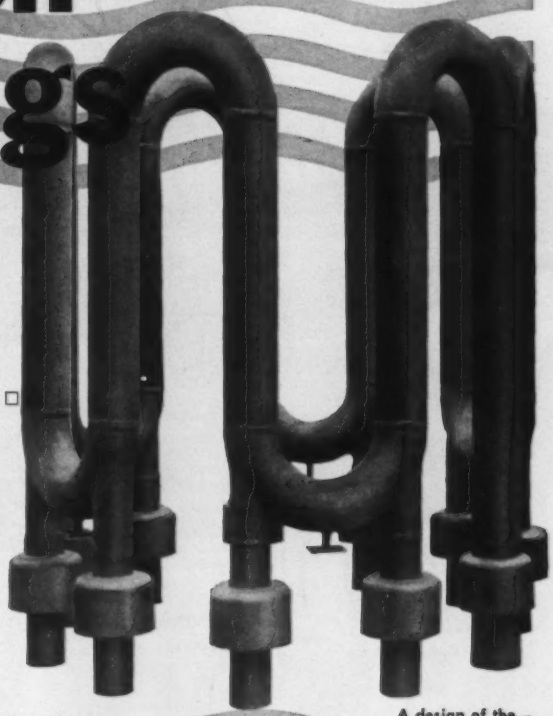
Tubular Goods Prices, Page 159

Tubular goods are beginning to move at a slightly better rate from the mills. Youngstown Sheet & Tube Co. reports a big pickup in orders for seamless pipe. Volume is sufficient to keep the company's two seamless mills in operation at Youngstown. Some millmen are reported working overtime.

A southern producer says January was the best month in orders in more than a year. The pickup, it says, was particularly heavy in flat rolled items and steel pipe. Expectations are demand for tubular items will continue to rise as spring nears.

The latest weekly survey by the

when things are HOT.. call on Duraloy



A design of the A. F. Holden Co., Detroit, Mich.

Castings that Keep their Load-Carrying Strength at High Temperatures

This "immersion type radiant heater" is typical of the high reliability castings turned out by DURALOY. Centrifugally cast tubes with *UNIFORM* wall thickness...for longest service life. Static cast collars and shell molded bends...typical of DURALOY versatility.

For your high alloy casting requirements check with DURALOY... our long experience, ultra-modern foundry and up-to-the-minute test equipment will be helpful in solving your problems. For more information ask for Bulletin No. 3150 G.

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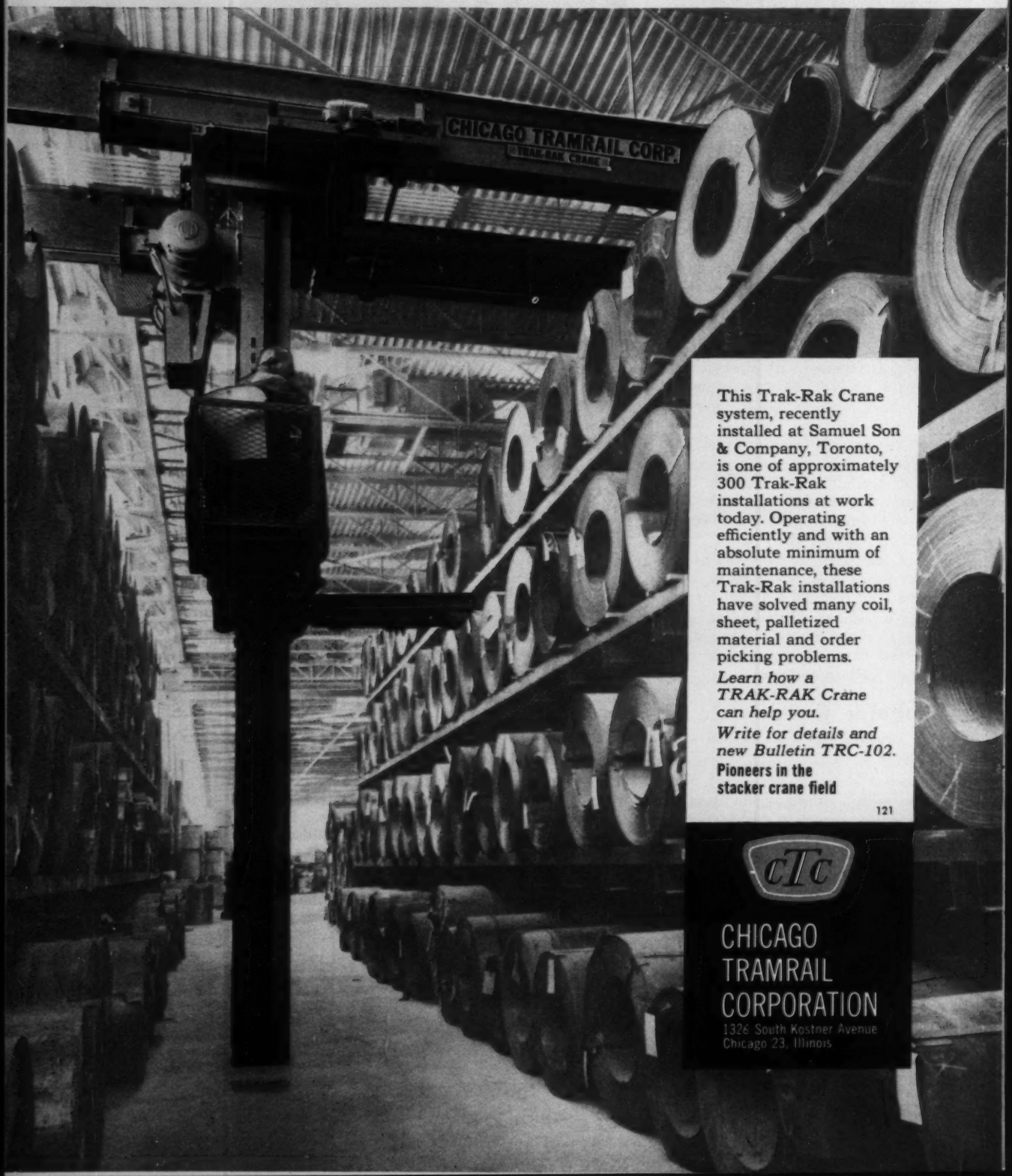

This Trak-Rak Crane system, recently installed at Samuel Son & Company, Toronto, is one of approximately 300 Trak-Rak installations at work today. Operating efficiently and with an absolute minimum of maintenance, these Trak-Rak installations have solved many coil, sheet, palletized material and order picking problems.

Learn how a TRAK-RAK Crane can help you.

Write for details and new Bulletin TRC-102.

Pioneers in the stacker crane field

121

CTC

CHICAGO TRAMRAIL CORPORATION

1326 South Kostner Avenue
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Hughes Tool Co. showed a decrease in rotary oil rigs in operation in the U. S. for the fourth straight week. The U. S. had 1505 rigs operating, down 39 from the preceding week. Canada had 186 active, up 24.

More Ore Consumed During 1960 but Stocks Increase

Stocks of iron ore in the U. S. and Canada (from all sources) at the end of December, 1960, totaled 77,419,994 gross tons vs. 67,254,826 at the end of 1959, reports the American Iron Ore Association. Of the total, 73,954,554 tons were held in the U. S. and 3,465,440 in Canada. (For a breakdown of stocks on the basis of supply sources see the accompanying table.)

Consumption of ore during December totaled 6,313,173 gross tons vs. 12,107,407 in the same month of 1959. Total consumption (U. S. and Canada) in all of 1960 was 108,679,846 tons vs. 100,936,731 the preceding year. Use of U. S. Lake Superior ore in December amounted to 3,459,612 tons vs. 5,828,265 in the same month of 1959. (For a breakdown of consumption on the basis of supply sources see table.)

Pig Iron . . .

Pig Iron Prices, Page 160

Severe weather in the East forced curtailment of operations in many foundries in the area. Movement of merchant pig iron was light.

Whether consumption this month (on an average daily basis) will be any higher than it was in January remains a question. Tonnage for the month will probably be smaller than the previous month's.

Merchant iron producers are maintaining reduced operating schedules. No substantial pickup in production is expected until the middle of March when some users of castings, including especially those in the building trades, normally have a spurt in activity.

Wire . . .

Wire Prices, Pages 157 & 158

Sellers of manufacturers' wire are quoting shipments of most grades within seven to ten days. However, certain items can't be shipped under three to four weeks. Merchant wire is still being moved

Iron Ore Statistics—December, 1960

Iron Ore in Inventory—December, 1960
(Gross tons; from all sources)

At U. S. Furnace yards:	U. S. Ores L. Sup.	U. S. Ores Other	Canadian Ores L. Sup.	Canadian Ores Other	Foreign	Total
Start of month	42,789,114	3,477,096	2,102,902	5,508,485	16,473,133	70,350,730
End of Month:						
Mass., N. Y.	3,460,107	24,638	97,304	210,009	323,735	4,115,793
Pennsylvania	7,940,876	470,596	29,877	249,514	8,070,292	16,761,155
Md., Va., W. Va.	673,487	5,233	.....	2,159,819	2,532,054	5,370,593
Ky., Tenn., Tex.	327,935	136,429	.....	356,181	126,717	947,262
Alabama	871	1,802,187	.....	126,986	3,623,929	5,553,973
Ohio	10,572,421	30,079	863,669	1,954,781	1,327,170	14,748,120
Indiana	8,351,284	26,946	548,078	6,463	81,990	9,014,761
Illinois	4,978,139	58,071	46,209	.....	253,034	5,335,453
Mich., Minn.	3,499,878	.....	372,327	115,916	442,524	4,430,645
Col., Utah, Calif.	.....	811,145	.....	.....	23,292	834,437
Undistributed	897	2,519	.....	.....	98	3,514
End of month total	39,805,895	3,367,843	1,957,464	5,179,669	16,804,835	67,115,706
At U. S. Docks	3,550,005	.....	215,495	897,471	2,175,877	6,838,848
Total U. S. stocks	43,355,900	3,367,843	2,172,959	6,077,140	18,980,712	73,954,554
At Canadian Furnaces:						
Start of Month	2,947,644	.....	134,110	516,247	61,569	3,659,570
End of Month	2,694,682	.....	133,116	542,092	95,550	3,465,440
Total U. S.-Canada	46,050,582	3,367,843	2,306,075	6,619,232	19,076,262	77,419,994

Consumption of Iron Ore—December, 1960

In U. S.:	U. S. Ores L. Sup.	U. S. Ores Other	Canadian Ores L. Sup.	Canadian Ores Other	Foreign	Total
Mass., N. Y.	307,627	1,774	5,588	16,983	12,212	344,184
Pennsylvania	706,270	162,058	486	38,661	546,342	1,453,817
Md., Va., W. Va.	87,347	15,334	.....	202,156	231,791	536,628
Ky., Tenn., Tex.	30,424	29,381	.....	30,685	8,730	99,220
Alabama	.....	360,799	.....	.....	131,453	492,252
Ohio	625,709	11,936	17,563	74,246	106,434	835,888
Indiana	686,087	125	56,054	1,512	16,840	760,418
Illinois	418,522	7,804	7,237	.....	45,262	478,825
Mich., Minn.	344,626	.....	58,510	3,118	11,699	417,953
Col., Utah, Calif.	.....	469,247	.....	.....	6,174	475,421
Undistributed	38	54	.....	.....	.....	92
In U. S.						
Blast furnaces	2,343,100	589,578	52,733	151,803	274,181	3,411,395
Steel furnaces	77,131	32,346	4,187	11,658	277,082	402,404
Sintering	786,359	430,381	88,518	203,887	565,469	2,074,614
Miscellaneous	60	6,207	.....	13	5	6,285
Total U. S.	3,206,650	1,058,512	145,438	367,361	1,116,737	5,894,698
In Canada:						
Blast furnaces	200,772	.....	54,076	69,917	113	324,878
Steel furnaces	.....	.....	.....	17,528	4,554	22,082
Sintering	52,190	.....	.....	19,325	.....	71,515
Total U. S. & Canada	3,459,612	1,058,512	199,514	474,131	1,121,404	6,313,173

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SPECIAL METALS...

SPECIAL RUSH!!!

Ulbrich Stainless is precision rolled to close tolerances on Sendzimir Mills such as the one pictured here in operation.

Ferrous, nickel and super alloys plus special metals in coil form are all stocked in quantity at Ulbrich. Coils in gauges down to .001 all tempers and other specific requirements. Weights from 1 ounce to 2,000 pounds or more. Write for complete Ulbrich stock list on special metals and super alloys plus stainless steel strip.

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from stock, with foreign competition continuing to cut into domestic volume.

Steel Ingot Production Moves Slightly Higher

STEEL estimates ingot production for the week ended Feb. 11 at 1.5 million tons, an increase of 0.5 per cent over the previous week's total of 1,492,000 tons.

Indications are there will be only minor fluctuations in production the balance of the month. Steelmen feel chances are favorable for a slight increase over January's output. Reasons: Rising demand from appliance makers, oil and gas producers, and steel service centers.

● **Youngstown** — Production rose slightly during the week ended Feb. 11. It was the third consecutive weekly gain recorded in the district. However, the operating rate is expected to begin dropping here as Youngstown Sheet & Tube Co. starts a changeover of rolling operations at its Campbell (Ohio) Works to a revamped 79 in. strip mill. YS&T has been accumulating an inventory of steel to supply customers during the changeover. The company will also close its Brier Hill Works at Youngstown late in March for a few weeks—it will revamp the blooming mill there to handle larger slabs.

● **Pittsburgh**—Operations here are moving sidewise at 69 per cent of the 1957-59 weekly average. That is equivalent to 47 per cent of the district's capacity as of Jan. 1, 1960 (the latest reported). No change was expected in the week ended Feb. 11.

● **Chicago**—STEEL estimates that ingot output held unchanged during the week ended Feb. 11 at the equivalent of 54 per cent of the Jan. 1, 1960, capacity. Slightly stronger demand for steel will have little effect on February operations.

● **Detroit**—Steelmakers forecast a slight pickup in ingot production to bring rates back to early January levels when operations were close to 100 per cent of the 1957-59 weekly average. STEEL estimates output for the week ended Feb. 11 at about 97 per cent compared with 93 for the week ended Feb. 4.

● **Birmingham** — STEEL estimates production in this area for the week ended Feb. 11 at 81,243 tons, a drop of 3306 tons from the preceding week. That is equivalent to about 59 per cent of the capacity on which 1960 rates were based. Atlantic Steel Co., Atlanta, was down for a week because of a flooded motor in its blooming mill caused by an ice storm. The company resumed steelmaking during the week ended Feb. 11.

● **Buffalo** — The steelmaking rate here declined during the week ended Feb. 11 to about 36.5 per cent of capacity, with the shutting down for repairs of an open hearth at the Bethlehem Steel mill. The company will relight the unit as soon as repairs are completed. The outlook for high production at Buffalo area steel mills during the balance of this month is not encouraging. Orders from automakers are disappointing, although steel officials were cheered some last week by reports in the Western New York area that new car sales are perking up a little.

STEEL learned that use of oxygen in open hearth operations at the Bethlehem and Republic mills is enabling the producers to get a high ratio of tonnage for the number of furnaces in use. Tonnage per heat is running considerably larger than formerly.

● **Cleveland**—Only minor week-to-week changes in operating schedules at steel mills are expected in this area during February. Output for the week ended Feb. 11 is estimated by STEEL at 75 per cent of the 1957-59 weekly average.

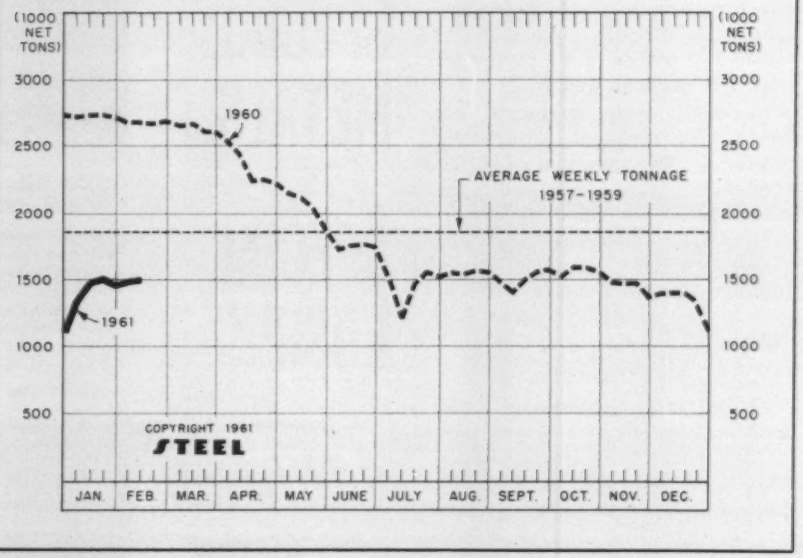
● **Los Angeles**—There seems to be a gradual recovery in ingot production on the West Coast. STEEL estimates production at 54 per cent of capacity for the week ended Feb. 11. A gain of two or three percentage points is expected by the month's end.

STEEL INGOT PRODUCTION

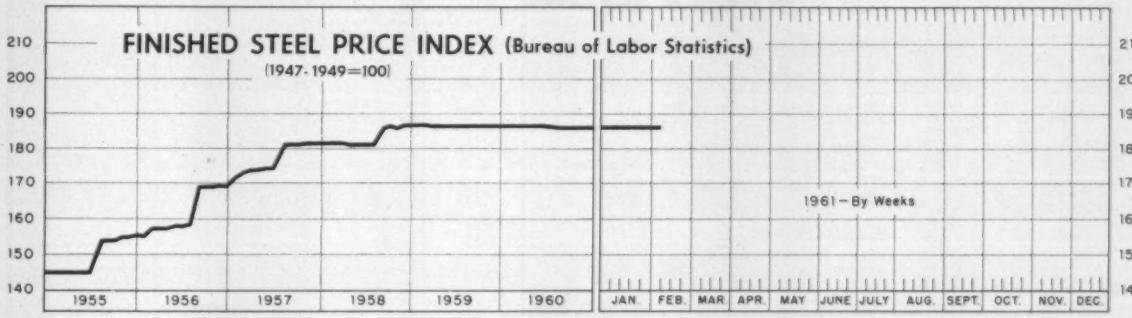
Weeks Ended	Net Tons	Change
Feb. 11	1,500,000*	+ 0.5%
Feb. 4	1,492,000	+ 1.8%
Jan. 28	1,466,000	− 2.2%
Totals to Feb. 4		
1961	7,300,000	−46.2%
1960	13,569,000	

DISTRICTS	Week Ended — Feb. 4 — Tons‡	Index†	Week Ended Jan. 28 Index†
Northeastern	216,429	81	77
Buffalo	69,122	71	73
Pittsburgh	278,449	69	69
Youngstown	135,985	80	76
Cleveland	69,446	75	73
Detroit	97,723	93	99
Chicago	321,705	86	84
Cincinnati	64,848	86	88
St. Louis	45,193	86	80
Southern	84,549	78	80
Western	108,729	93	84
Industry	1,492,000	80.1	78.7

*Estimated by STEEL. †1957-59=100.
‡District tonnages are approximate and will not necessarily add to the national total.



Price Indexes and Composites



Feb. 7, 1961	Week Ago	Month Ago	Jan. Index	Year Ago
186.2	186.2	186.2	186.2	186.8

AVERAGE PRICES OF STEEL (Bureau of Labor Statistics)

Week Ended Feb. 7

Prices include mill base prices and typical extras and deductions. Units are 100 lb except where otherwise noted in parentheses. For complete description of the following products and extras and deductions applicable to them, write to STEEL.

Rails, Standard No. 1	$5.825
Rails, Light, 40 lb	7.292
Tie Plates	6.875
Axles, Railway	10.175
Wheels, Freight Car, 33 in. (per wheel)	62.000
Plates, Carbon	6.350
Structural Shapes	6.167
Bars, Tool Steel, Carbon (lb)	0.560
Bars, Tool Steel, Alloy, Oil Hardening Die (lb)	0.680
Bars, Tool Steel, H.R. Alloy, High Speed, W 6.75, Cr 4.5, V 2.1, Mo 5.5, C 0.060 (lb)	1.400
Bars, Tool Steel, H.R. Alloys, High Speed, W18 Cr 4, V 1 (lb)	1.895
Bars, H.R., Alloy	10.775
Bars, H.R., Stainless, 303 (lb)	0.543
Bars, H.R., Carbon	6.675
Bars, Reinforcing	6.335
Bars, C.F., Carbon	10.710
Bars, C.F., Alloy	14.125
Bars, C.F., Stainless, 302 (lb)	0.570
Sheets, H.R., Carbon	6.350
Sheets, C.R., Carbon	7.300
Sheets, Galvanized	8.775
Sheets, C.R., Stainless, 302 (lb)	0.658
Sheets, Electrical	12.625
Strip, C.R., Carbon	9.489
Strip, C.R., Stainless, 430 (lb)	0.480
Strip, H.R., Carbon	6.250
Pipe, Black, Buttweld (100 ft)	19.495
Pipe, Galv., Buttweld (100 ft)	23.098
Pipe, Line (100 ft)	195.430
Casing, Oil Well, Carbon (100 ft)	201.080
Casing, Oil Well, Alloy (100 ft)	315.213
Tubes, Boiler (100 ft)	51.200
Tubing, Mechanical, Carbon (100 ft)	27.005
Tubing, Mechanical, Stainless, 304 (100 ft)	194.268
Tin plate, Hot-dipped, 1.25 lb (95 lb base box)	10.100
Tin Plate, Electrolytic, 0.25 lb (95 lb base box)	8.800
Black Plate, Canmaking Quality (95 lb base box)	7.900
Wire, Drawn, Carbon	10.575
Wire, Drawn, Stainless, 430 (lb)	0.665
Bale Ties (Bundles)	7.647
Nails, Wire, 8d Common	9.433
Wire, Barbed (80-rod spool)	8.372
Woven Wire Fence (20-rod roll)	20.910

STEEL's FINISHED STEEL PRICE INDEX

	Feb. 8 1961	Week Ago	Month Ago	Year Ago	5 Yr Ago
Index (1935-39 avg=100)	247.82	247.82	247.82	247.82	209.10
Index in cents per lb	6.713	6.713	6.713	6.713	5.665

STEEL's ARITHMETICAL PRICE COMPOSITES

Finished Steel, NT	$149.96	$149.96	$149.96	$149.96	$127.91
No. 2 Fdry, Pig Iron, GT	66.49	66.49	66.49	66.49	58.99
Basic Pig Iron, GT	65.99	65.99	65.99	65.99	58.49
Malleable Pig Iron, GT	67.27	67.27	67.27	67.27	59.77
Steelmaking Scrap, GT	32.67	32.67	31.83	41.50	50.33

Comparison of Prices

Comparative prices by districts in cents per pound except as otherwise noted. Delivered prices based on nearest production point.

FINISHED STEEL

	Feb. 8 1961	Week Ago	Month Ago	Year Ago	5 Yr Ago
Bars, H.R., Pittsburgh	5.675	5.675	5.675	5.675	4.65
Bars, H.R., Chicago	5.675	5.675	5.675	5.675	4.65
Bars, H.R., deld., Philadelphia	5.97	5.97	5.97	5.975	4.90
Bars, C.R., Pittsburgh	7.65	7.65	7.65	7.65	6.25
Shapes, Std., Pittsburgh	5.50	5.50	5.50	5.50	4.60
Shapes, Std., Chicago	5.50	5.50	5.50	5.50	4.60
Shapes, deld., Philadelphia	5.745	5.745	5.745	5.77	4.88
Plates, Pittsburgh	5.30	5.30	5.30	5.30	4.50
Plates, Chicago	5.30	5.30	5.30	5.30	4.50
Plates, Coatesville, Pa.	5.30	5.30	5.30	5.30	4.80
Plates, Sparrows Point, Md.	5.30	5.30	5.30	5.30	4.50
Plates, Claymont, Del.	5.30	5.30	5.30	5.30	4.80
Sheets, H.R., Pittsburgh	5.10	5.10	5.10	5.10	4.325
Sheets, H.R., Chicago	5.10	5.10	5.10	5.10	4.325
Sheets, C.R., Pittsburgh	6.275	6.275	6.275	6.275	5.325
Sheets, C.R., Chicago	6.275	6.275	6.275	6.275	5.325
Sheets, C.R., Detroit	6.275	6.275	6.275	6.275	5.325-5.425
Sheets, Galv., Pittsburgh	6.875	6.875	6.875	6.875	5.85
Strip, H.R., Pittsburgh	5.10	5.10	5.10	5.10	4.325
Strip, H.R., Chicago	5.10	5.10	5.10	5.10	4.325
Strip, C.R., Pittsburgh	7.425	7.425	7.425	7.425	6.25
Strip, C.R., Chicago	7.425	7.425	7.425	7.425	6.25-6.35
Strip, C.R., Detroit	7.425	7.425	7.425	7.425	6.35
Wire, Basic, Pittsburgh	8.00	8.00	8.00	8.00	6.60
Nails, Wire, nonstock, Pitts.	8.95	8.95	8.95	8.95	7.60
Tin Plate (1.50 lb) box, Pitts.	$10.65	$10.65	$10.65	$10.65	$9.45

SEMIFINISHED STEEL

Billets, forging, Pitts. (NT)	$99.50	$99.50	$99.50	$99.50	$84.50
Wire rods, $\frac{7}{32}$-$\frac{9}{16}$" Pitts.	6.40	6.40	6.40	6.40	5.025-5.375

PIG IRON, Gross Ton

	Feb. 8 1961	Week Ago	Month Ago	Year Ago	5 Yr Ago
Bessemer, Pittsburgh	$67.00	$67.00	$67.00	$67.00	$59.50
Basic, Valley	66.00	66.00	66.00	66.00	58.50
Basic, deld., Philadelphia	70.18	70.18	70.18	70.41	62.16
No. 2 Fdry, Neville Island, Pa.	66.50	66.50	66.50	66.50	59.00
No. 2 Fdry, Chicago	66.50	66.50	66.50	66.50	59.00
No. 2 Fdry, deld., Phila.	70.68	70.68	70.68	70.91	62.66
No. 2 Fdry, Birmingham	62.50	62.50	62.50	62.50	55.00
No. 2 Fdry (Birm.), deld., Cin.	70.20	70.20	70.20	70.20	62.70
Malleable, Valley	66.50	66.50	66.50	66.50	59.00
Malleable, Chicago	66.50	66.50	66.50	66.50	59.00
Ferromanganese, net tons†	245.00	245.00	245.00	245.00	205.00

†74-76% Mn, Duquesne, Pa.

SCRAP, Gross Ton (Including broker's commission)

No. 1 Heavy Melt, Pittsburgh	$31.50	$31.50	$29.50	$42.50	$50.50
No. 1 Heavy Melt, E. Pa.	36.00	36.00	35.00	41.00	51.50
No. 1 Heavy Melt, Chicago	30.50	30.50	31.00	41.00	49.00
No. 1 Heavy Melt, Valley	32.50	32.50	32.50	43.50	53.00
No. 1 Heavy Melt, Cleve.	28.50	28.50	28.50	40.50	49.50
No. 1 Heavy Melt, Buffalo	27.50	27.50	25.50	36.50	46.50
Rails, Rerolling, Chicago	54.50	54.50	54.50	63.50	66.50
No. 1 Cast, Chicago	41.50	41.50	39.50	53.50	46.50

COKE, Net Ton

Beehive, Furn., Connisvl.	$15.00	$15.00	$15.00	$15.00	$14.125
Beehive, Fdry., Connisvl.	18.25	18.25	18.25	18.25	16.50
Oven, Fdry., Milwaukee	32.00	32.00	32.00	32.00	27.50

Steel Prices

Mill prices as reported to STEEL, Feb. 1, cents per pound except as otherwise noted. *Changes shown in italics.* Code number following mill point indicates producing company. Key to producers, page 156; footnotes, page 158.

SEMIFINISHED

INGOTS, Carbon, Forging (NT)
Munhall,Pa. U5 ..... $76.00

INGOTS, Alloy (NT)
Detroit S41 ..... $82.00
Economy,Pa. B14 ..... 82.00
Farrell,Pa. S3 ..... 82.00
Lowellville,O. S3 ..... 82.00
Midland,Pa. C18 ..... 82.00
Munhall,Pa. U5 ..... 82.00
Sharon,Pa. S3 ..... 82.00

BILLETS, BLOOMS & SLABS Carbon Rerolling (NT)
Bartonville,Ill. K4 ... $82.00
Bessemer,Pa. U5 ..... 80.00
Buffalo R2 ..... 80.00
Clairton,Pa. U5 ..... 80.00
Ensley,Ala. T2 ..... 80.00
Fairfield,Ala. T2 ..... 80.00
Fontana,Calif. K1 ..... 90.50
Gary,Ind. U5 ..... 80.00
Johnstown,Pa. B2 ..... 80.00
Lackawanna,N.Y. B2 .. 80.00
Munhall,Pa. U5 ..... 80.00
Owensboro,Ky. G8 ..... 80.00
S.Chicago,Ill. R2, U5 .. 80.00
S.Duquesne,Pa. U5 ..... 80.00
Sterling,Ill. N15 ..... 80.00
Youngstown R2 ..... 80.00

Carbon, Forging (NT)
Bessemer,Pa. U5 ..... $99.50
Buffalo R2 ..... 99.50
Canton,O. R2 ..... 102.00
Clairton,Pa. U5 ..... 99.50
Conshohocken,Pa. A3 .. 104.50
Ensley,Ala. T2 ..... 99.50
Fairfield,Ala. T2 ..... 99.50
Farrell,Pa. S3 ..... 99.50
Fontana,Calif. K1 .... 109.00
Gary,Ind. U5 ..... 99.50
Geneva,Utah C11 ..... 99.50
Houston S5 ..... 104.50
Johnstown,Pa. B2 ..... 99.50
Lackawanna,N.Y. B2 .. 99.50
LosAngeles B3 ..... 109.00
Midland,Pa. C18 ..... 99.50
Munhall,Pa. U5 ..... 99.50
Owensboro,Ky. G8 ..... 99.50
Seattle B3 ..... 109.00
Sharon,Pa. S3 ..... 99.50
S.Chicago R2, U5, W14 .. 99.50
S.Duquesne,Pa. U5 .... 99.50
S.SanFrancisco B3 .... 109.00
Warren,O. C17 ..... 99.50

Alloy, Forging (NT)
Bethlehem,Pa. B2 ... $119.00
Bridgeport,Conn. C32 .. 119.00
Buffalo R2 ..... 119.00
Canton,O. R2, T7 .... 119.00
Conshohocken,Pa. A3 .. 126.00
Detroit S41 ..... 119.00
Economy,Pa. B14 .... 119.00
Farrell,Pa. S3 ..... 119.00
Fontana,Calif. K1 .... 140.00
Gary,Ind. U5 ..... 119.00
Houston S5 ..... 124.00
Ind.Harbor,Ind. Y1 ... 119.00
Johnstown,Pa. B2 .... 119.00
Lackawanna,N.Y. B2.. 119.00
LosAngeles B3 ..... 139.00
Lowellville,O. S3 .... 119.00
Massillon,O. R2 ..... 119.00
Midland,Pa. C18 ..... 119.00
Munhall,Pa. U5 ..... 119.00
Owensboro,Ky. G8 .... 119.00
Seattle(6) B3 ..... 140.00
Sharon,Pa. S3 ..... 119.00
S.Chicago R2,U5,W14 .. 119.00
S.Duquesne,Pa. U5 .... 119.00
Struthers,O. Y1 ..... 119.00
Warren,O. C17 ..... 119.00

ROUNDS, SEAMLESS TUBE (NT)
Buffalo R2 ..... $122.50
Canton,O. R2 ..... 125.00
Cleveland R2 ..... 122.50
Gary,Ind. U5 ..... 122.50
S.Chicago,Ill. R2,W14 .. 122.50
S.Duquesne,Pa. U5 .... 122.50
Warren,O. C17 ..... 122.50

SKELP
Aliquippa,Pa. J5 ..... 5.05
Benwood,W.Va. W10 .... 5.05
Ind.Harbor,Ind. Y1 .... 5.05
Munhall,Pa. U5 ..... 5.05
Pittsburgh J5 ..... 5.05
Warren,O. R2 ..... 5.05
Youngstown R2, U5 .... 5.05

WIRE RODS
AlabamaCity,Ala. R2 .. 6.40
Aliquippa,Pa. J5 ..... 6.40
Alton,Ill. L1 ..... 6.60
Bartonville,Ill. K4 .... 6.50
Buffalo W12 ..... 6.40
Cleveland A7 ..... 6.40
Donora,Pa. A7 ..... 6.40
Fairfield,Ala. T2 ..... 6.40
Houston S5 ..... 6.65
IndianaHarbor,Ind. Y1.. 6.40
Johnstown,Pa. B2 ..... 6.40
Joliet,Ill. A7 ..... 6.40
KansasCity,Mo. S5 .... 6.65
Kokomo,Ind. C16 ..... 6.50
LosAngeles B3 ..... 7.20
Minnequa,Colo. C10 .... 6.65
Monessen,Pa. P7 ..... 6.40
Pittsburg,Calif. C11 .... 7.20
Portsmouth,O. P12 .... 6.40
Roebling,N.J. R5 ..... 6.50
S.Chicago,Ill. R2, W14.. 6.40
SparrowsPoint,Md. B2 .. 6.50
Sterling,Ill.(1) N15 .... 6.40
Sterling,Ill. N15 ..... 6.50
Struthers,O. Y1 ..... 6.40
Worcester,Mass. A7 .... 6.70

STRUCTURALS

Carbon Steel Std. Shapes
AlabamaCity,Ala. R2 ... 5.50
Aliquippa,Pa. J5 ..... 5.50
Atlanta A11 ..... 5.70
Bessemer,Ala. T2 ..... 5.50
Bethlehem,Pa. B2 ..... 5.55
Birmingham C15 ..... 5.50
Clairton,Pa. U5 ..... 5.50
Fairfield,Ala. T2 ..... 5.50
Fontana,Calif. K1 .... 6.30
Gary,Ind. U5 ..... 5.50
Geneva,Utah C11 ..... 5.50
Houston S5 ..... 5.60
Ind.Harbor,Ind. I-2, Y1.. 5.50
Johnstown,Pa. B2 ..... 5.55
Joliet,Ill. P22 ..... 5.50
KansasCity,Mo. S5 .... 5.60
Lackawanna,N.Y. B2 .. 5.55
LosAngeles B3 ..... 6.20
Minnequa,Colo. C10 .... 5.80
Munhall,Pa. U5 ..... 5.50
Niles,Calif. P1 ..... 6.25
Phoenixville,Pa. P4 .... 5.55
Portland,Oreg. O4 .... 6.25
Seattle B3 ..... 6.25
S.Chicago,Ill. U5, W14 .. 5.50
S.SanFrancisco B3 .... 6.15
Sterling,Ill. N15 ..... 5.50
Torrance,Calif. C11 .... 6.20
Weirton,W.Va. W6 .... 5.50

Wide Flange
Bethlehem,Pa. B2 ..... 5.55
Clairton,Pa. U5 ..... 5.50
Fontana,Calif. K1 .... 6.45
IndianaHarbor,Ind. I-2.. 5.50
Lackawanna,N.Y. B2 .. 5.55
Munhall,Pa. U5 ..... 5.50
Phoenixville,Pa. P4 .... 5.55
S.Chicago,Ill. U5 ..... 5.50
Sterling,Ill. N15 ..... 5.50
Weirton,W.Va. W6 .... 5.50

Alloy Std. Shapes
Aliquippa,Pa. J5 ..... 6.80
Clairton,Pa. U5 ..... 6.80
Gary,Ind. U5 ..... 6.80
Houston S5 ..... 6.90
Munhall,Pa. U5 ..... 6.80
S.Chicago,Ill. U5, W14.. 6.80

H.S., L.A., Std. Shapes
Aliquippa,Pa. J5 ..... 8.05
Bessemer,Ala. T2 ..... 8.05
Bethlehem,Pa. B2 ..... 8.10
Clairton,Pa. U5 ..... 8.05
Fairfield,Ala. T2 ..... 8.05
Fontana,Calif. K1 ..... 8.85
Gary,Ind. U5 ..... 8.05
Geneva,Utah C11 ..... 8.05
Houston S5 ..... 8.15
Ind.Harbor,Ind. I-2, Y1.. 8.05
Johnstown,Pa. B2 ..... 8.10
KansasCity,Mo. S5 .... 8.15
Lackawanna,N.Y. B2 .. 8.10
LosAngeles B3 ..... 8.75
Munhall,Pa. U5 ..... 8.05
Seattle B3 ..... 8.80
S.Chicago,Ill. U5, W14.. 8.05
S.SanFrancisco B3 .... 8.70
Sterling,Ill. N15 ..... 7.75
Struthers,O. Y1 ..... 8.05

H.S., L.A., Wide Flange
Bethlehem,Pa. B2 ..... 8.10
Ind.Harbor,Ind. I-2 .... 8.05
Lackawanna,N.Y. B2 .. 8.10
Munhall,Pa. U5 ..... 8.05
S.Chicago,Ill. U5 ..... 8.05
Sterling,Ill. N15 ..... 7.75

PILING

BEARING PILES
Bethlehem,Pa. B2 ..... 5.55
Ind.Harbor,Ind. I-2 .... 5.50
Lackawanna,N.Y. B2 .. 5.55
Munhall,Pa. U5 ..... 5.50
S.Chicago,Ill. I-2, U5 .. 5.50

STEEL SHEET PILING
Ind.Harbor,Ind. I-2 .... 6.50
Lackawanna,N.Y. B2 .. 6.50
Munhall,Pa. U5 ..... 6.50
S.Chicago,Ill. I-2, U5 .. 6.50
Weirton,W.Va. W6 .... 6.50

PLATES

PLATES, Carbon Steel
AlabamaCity,Ala. R2 ... 5.30
Aliquippa,Pa. J5 ..... 5.30
Ashland,Ky.(15) A10 ... 5.30
Atlanta A11 ..... 5.50
Bessemer,Ala. T2 ..... 5.30
Clairton,Pa. U5 ..... 5.30
Claymont,Del. P4 ..... 5.30
Cleveland J5, R2 ..... 5.30
Coatesville,Pa. L7 .... 5.30
Conshohocken,Pa. A3 .. 5.30
Ecorse,Mich. G5 ..... 5.30
Fairfield,Ala. T2 ..... 5.30
Farrell,Pa. S3 ..... 5.30
Fontana,Calif.(30) K1 .. 6.10
Gary,Ind. U5 ..... 5.30
Geneva,Utah C11 ..... 5.30
GraniteCity,Ill. G4 .... 5.40
Houston S5 ..... 5.40
Ind.Harbor,Ind. I-2, Y1 .. 5.30
Johnstown,Pa. B2 ..... 5.30
Lackawanna,N.Y. B2 ... 5.30
Mansfield,O. E6 ..... 5.30
Minnequa,Colo. C10 .... 6.15
Munhall,Pa. U5 ..... 5.30
Newport,Ky. A2 ..... 5.30
Pittsburgh J5 ..... 5.30
Riverdale,Ill. A1 ..... 5.30
Seattle B3 ..... 6.20
Sharon,Pa. S3 ..... 5.30
S.Chicago,Ill. U5, W14.. 5.30
SparrowsPoint,Md. B2 .. 5.30
Sterling,Ill. N15 ..... 5.30
Steubenville,O. W10 .... 5.30
Warren,O. R2 ..... 5.30
Youngstown U5, Y1 .... 5.30
Youngstown(27) R2 .... 5.30

PLATES, Carbon Abras. Resist.
Claymont,Del. P4 ..... 7.05
Fontana,Calif. K1 ..... 7.85
Geneva,Utah C11 ..... 7.05
Houston S5 ..... 7.15
Johnstown,Pa. B2 ..... 7.05
SparrowsPoint,Md. B2 .. 7.05

PLATES, Wrought Iron
Economy,Pa. B14 ..... 14.10

PLATES, H.S., L.A.
Aliquippa,Pa. J5 ..... 7.95
Ashland,Ky. A10 ..... 7.95
Bessemer,Ala. T2 ..... 7.95
Clairton,Pa. U5 ..... 7.95
Claymont,Del. P4 ..... 7.95
Cleveland J5, R2 ..... 7.95
Coatesville,Pa. L7 .... 7.95
Conshohocken,Pa. A3 .. 7.95
Economy,Pa. B14 ..... 7.95
Ecorse,Mich. G5 ..... 7.95
Fairfield,Ala. T2 ..... 7.95
Farrell,Pa. S3 ..... 7.95
Fontana,Calif.(30) K1 .. 8.75
Gary,Ind. U5 ..... 7.95
Geneva,Utah C11 ..... 7.95
Houston S5 ..... 8.05
Ind.Harbor,Ind. I-2, Y1.. 7.95
Johnstown,Pa. B2 ..... 7.95
Munhall,Pa. U5 ..... 7.95
Pittsburgh J5 ..... 7.95
Seattle B3 ..... 8.85
Sharon,Pa. S3 ..... 7.95
S.Chicago,Ill. U5, W14.. 7.95
SparrowsPoint,Md. B2 .. 7.95
Sterling,Ill. N15 ..... 7.625
Warren,O. R2 ..... 7.95
Youngstown U5, Y1 .... 7.95

PLATES, Alloy
Aliquippa,Pa. J5 ..... 7.50
Claymont,Del. P4 ..... 7.50
Coatesville,Pa. L7 .... 7.50
Economy,Pa. B14 ..... 7.50
Farrell,Pa. S3 ..... 7.50
Fontana,Calif. K1 .... 8.30
Gary,Ind. U5 ..... 7.50
Houston S5 ..... 7.60
Ind.Harbor,Ind. Y1 .... 7.50
Johnstown,Pa. B2 ..... 7.50
Lowellville,O. S3 ..... 7.50
Munhall,Pa. U5 ..... 7.50
Newport,Ky. A2 ..... 7.50
Pittsburgh J5 ..... 7.50
Seattle B3 ..... 8.40
Sharon,Pa. S3 ..... 7.50
S.Chicago,Ill. U5, W14.. 7.50
SparrowsPoint,Md. B2 .. 7.50
Youngstown Y1 ..... 7.50

FLOOR PLATES
Cleveland J5 ..... 6.375
Claymont,Del. P4 ..... 6.375
Conshohocken,Pa. A3 .. 6.375
Ind.Harbor,Ind. I-2 .... 6.375
Munhall,Pa. U5 ..... 6.375
Pittsburgh J5 ..... 6.375
S.Chicago,Ill. U5 ..... 6.375

PLATES, Ingot Iron
Ashland c.l.(15) A10 ... 5.55
Ashland l.c.l.(15) A10 .. 6.05
Cleveland c.l. R2 ..... 6.05
Warren,O. R2 ..... 6.05

BARS

BARS, Hot-Rolled Carbon (Merchant Quality)
Ala.City,Ala.(9) R2 ... 5.675
Aliquippa,Pa.(9) J5 ... 5.675
Alton,Ill. L1 ..... 5.875
Atlanta(9) A11 ..... 5.875
Bessemer,Ala.(9) T2 .. 5.675
Birmingham(9) C15 .... 5.675
Buffalo(9) R2 ..... 5.675
Canton,O.(23) R2 ..... 6.15
Clairton,Pa.(9) U5 .... 5.675
Cleveland(9) R2 ..... 5.675
Ecorse,Mich.(9) G5 .... 5.675
Emeryville,Calif. J7 .... 6.425
Fairfield,Ala.(9) T2 .. 5.675
Fairless,Pa.(9) U5 .... 5.825
Fontana,Calif.(9) K1 .. 6.375
Gary,Ind.(9) U5 ..... 5.675
Houston(9) S5 ..... 5.925
Ind.Harbor(9) I-2, Y1.. 5.675
Johnstown,Pa.(9) B2 .. 5.675
Joliet,Ill. P2 ..... 5.675
KansasCity,Mo.(9) S5.. 5.925
Lackawanna(9) B2 .... 5.675
LosAngeles(9) B3 .... 6.375
Massillon,O.(23) R2 .... 6.15
Midland,Pa.(23) C18 .. 6.025
Milton,Pa. M18 ..... 5.825
Minnequa,Colo. C10 .... 6.125
Niles,Calif. P1 ..... 6.375
Owensboro,Ky.(9) G8 .. 6.025
Pittsburg,Calif.(9) C11.. 6.375
Pittsburgh(9) J5 ..... 5.675
Portland,Oreg. O4 .... 6.425
Riverdale,Ill.(9) A1 ... 5.675
Seattle(9) A24,B3,N15 .. 6.425
S.Ch'c'go(9)R2,U5,W14 5.675
S.Duquesne,Pa.(9) U5.. 5.675
S.SanFran.,Calif.(9)B3 6.425
Sterling,Ill.(1)(9) N15.. 5.675
Sterling,Ill.(9) N15 .... 5.775
Struthers,O.(9) Y1 .... 5.675
Tonawanda,N.Y. B12 .. 5.675
Torrance,Calif.(9) C11 . 6.375
Warren,O. C17 ..... 6.025
Youngstown(9) R2,U5.. 5.675

BARS, Hot-Rolled Alloy
Aliquippa,Pa. J5 ..... 6.725
Bethlehem,Pa. B2 ..... 6.725
Bridgeport,Conn. C32 .. 6.80
Buffalo R2 ..... 6.725
Canton,O. R2, T7 ..... 6.725
Clairton,Pa. U5 ..... 6.725
Detroit S41 ..... 6.725
Economy,Pa. B14 ..... 6.725
Ecorse,Mich. G5 ..... 6.725
Farrell,Pa. S3 ..... 6.725
Fontana,Calif. K1 .... 7.775
Gary,Ind. U5 ..... 6.725
Houston S5 ..... 6.975
Ind.Harbor,Ind. I-2, Y1 6.725
Johnstown,Pa. B2 ..... 6.725
KansasCity,Mo. S5 .... 6.975
Lackawanna,N.Y. B2 .. 6.725
LosAngeles B3 ..... 7.775
Lowellville,O. S3 ..... 6.725
Massillon,O. R2 ..... 6.725
Midland,Pa. C18 ..... 6.725
Owensboro,Ky. G8 .... 6.725
Pittsburgh J5 ..... 6.725
Seattle(6) B3 ..... 7.825
Sharon,Pa. S3 ..... 6.725
S.Chicago R2, U5, W14.. 6.725
S.Duquesne,Pa. U5 .... 6.725
Struthers,O. Y1 ..... 6.725
Warren,O. C17 ..... 6.725
Youngstown U5 ..... 6.725

BARS & SMALL SHAPES, H.R. High-Strength, Low-Alloy
Aliquippa,Pa. J5 ..... 8.30
Bessemer,Ala. T2 ..... 8.30
Bethlehem,Pa. B2 ..... 8.30
Clairton,Pa. U5 ..... 8.30
Cleveland R2 ..... 8.30
Ecorse,Mich. G5 ..... 8.30
Fairfield,Ala. T2 ..... 8.30
Fontana,Calif. K1 ..... 9.00
Gary,Ind. U5 ..... 8.30
Houston S5 ..... 8.55
Ind.Harbor,Ind. Y1 .... 8.30
Johnstown,Pa. B2 ..... 8.30
KansasCity,Mo. S5 .... 8.55
Lackawanna,N.Y. B2 .. 8.30
LosAngeles B3 ..... 9.00
Pittsburgh J5 ..... 8.30
Seattle B3 ..... 9.05
S.Chicago,Ill. R2, W14.. 8.30
S.Duquesne,Pa. U5 .... 8.30
S.SanFrancisco B3 .... 9.05
Sterling,Ill. N15 ..... 7.925
Struthers,O. Y1 ..... 8.30
Youngstown U5 ..... 8.30

BAR SIZE ANGLES; H.R. Carbon
Bethlehem,Pa.(9) B2 .. 5.825
Houston(9) S5 ..... 5.925
KansasCity,Mo.(9) S5.. 5.925
Lackawanna(9) B2 .... 5.675
Sterling,Ill. N15 ..... 5.775
Sterling,Ill.(1) N15 ... 5.675
Tonawanda,N.Y. B12 .. 5.675

BAR SIZE ANGLES; S. SHAPES
Aliquippa,Pa. J5 ..... 5.675
Atlanta A11 ..... 5.875
Joliet,Ill. P22 ..... 5.675
Minnequa,Colo. C10 .... 6.125
Niles,Calif. P1 ..... 6.375
Pittsburgh J5 ..... 5.675
Portland,Oreg. O4 .... 6.425
SanFrancisco S7 ..... 6.52
Seattle B3 ..... 6.425

BAR SIZE ANGLES; S. SHAPES Wrought Iron
Economy,Pa. B14 ..... 16.45

BAR SHAPES, Hot-Rolled Alloy
Aliquippa,Pa. J5 ..... 6.80
Clairton,Pa. U5 ..... 6.80
Gary,Ind. U5 ..... 6.80
Houston S5 ..... 7.05
KansasCity,Mo. S5 .... 7.05
Pittsburgh J5 ..... 6.80
Youngstown U5 ..... 6.80

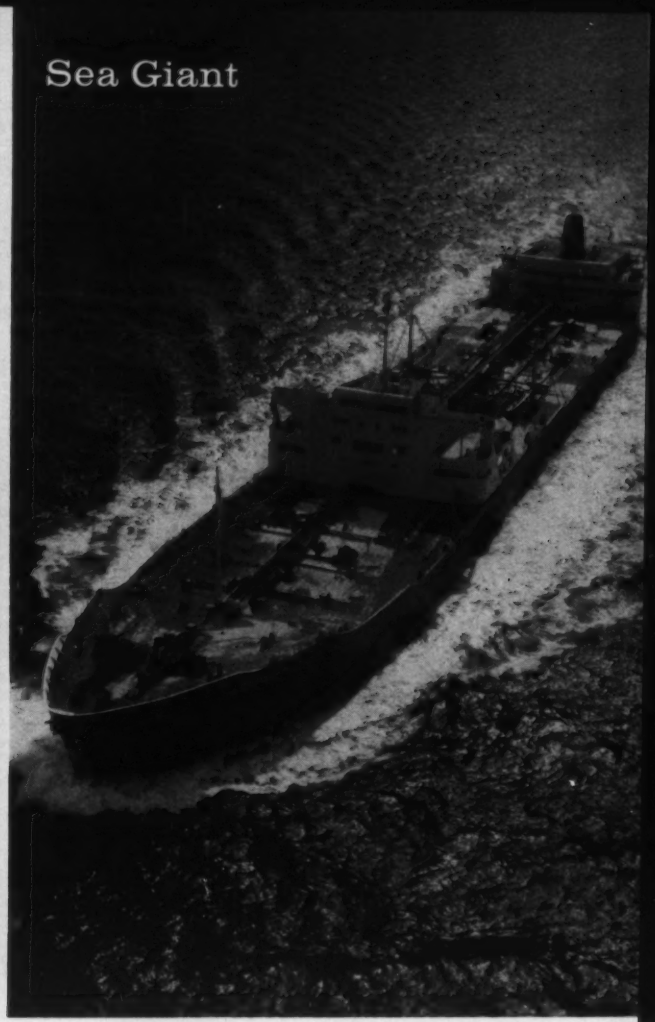
BARS, C.F. Loaded (Including loaded extra)
Carbon
LosAngeles P2, S30 ... 11.75*
Alloy
Ambridge,Pa. W18 .... 10.175
BeaverFalls,Pa. M12 .. 10.175
Camden,N.J. P13 ..... 10.35
Chicago W18 ..... 10.175
Elyria,O. W8 ..... 10.175
Monaca,Pa. S17 ..... 10.175
Newark,N.J. W18 ..... 10.35
SpringCity,Pa. K3 ..... 10.35

*Grade A; add 0.5c for Grade B.

BARS, Cold-Finished Carbon
Ambridge,Pa. W18 ..... 7.65
BeaverFalls,Pa. M12,R2. 7.65
Birmingham C15 ..... 8.25
Buffalo B5 ..... 7.70
Camden,N.J. P13 ..... 8.10
Carnegie,Pa. C12 ..... 7.65
Chicago W18 ..... 7.65
Cleveland A7, C20 ..... 7.65
Detroit B5, P17 ..... 7.85
Detroit S41 ..... 7.65
Donora,Pa. A7 ..... 7.65
Elyria,O. W8 ..... 7.65
FranklinPark,Ill. N5 ... 7.65
Gary,Ind. R2 ..... 7.65
GreenBay,Wis. F7 ..... 7.65
Hammond,Ind. J5, L2 .. 7.65
Hartford,Conn. R2 .... 8.15
Harvey,Ill. B5 ..... 7.65
LosAngeles(49) S30 .... 9.10
LosAngeles(49) P2, R2.. 9.10
Mansfield,Mass. B5 .... 8.20
Massillon,O. R2, R8 .... 7.65
Midland,Pa. C18 ..... 7.65
Monaca,Pa. S17 ..... 7.65
Newark,N.J. W18 ..... 8.10
NewCastle,Pa.(17) B4 .. 7.65
Pittsburgh J5 ..... 7.65
Plymouth,Mich. P5 .... 7.90
Putnam,Conn. W18 .... 8.20
Readville,Mass. C14 .... 8.20
Seattle(49) S30 ..... 9.10
S.Chicago,Ill. W14 .... 7.65
SpringCity,Pa. K3 .... 8.10
Struthers,O. Y1 ..... 7.65
Warren,O. C17 ..... 7.65
Waukegan,Ill. A7 ..... 7.65
Willimantic,Conn. J5 .. 8.15
Youngstown F3, Y1 .... 7.65

BARS, Cold-Finished Carbon (Turned and Ground)
Cumberland,Md.(5) C19.. 6.55

BARS, Cold-Finished Alloy
Ambridge,Pa. W18 .... 9.025
BeaverFalls,Pa. M12,R2 9.025
Bethlehem,Pa. B2 ..... 9.025
Bridgeport,Conn. C32 .. 9.175
Buffalo B5 ..... 9.025
Camden,N.J. P13 ..... 9.20
Canton,O. T7 ..... 9.025
Carnegie,Pa. C12 ..... 9.025
Chicago W18 ..... 9.025
Cleveland A7, C20 .... 9.025
Detroit B5, P17 ..... 9.225
Detroit S41 ..... 9.025
Donora,Pa. A7 ..... 9.025
Elyria,O. W8 ..... 9.025
FranklinPark,Ill. N5 .. 9.025
Gary,Ind. R2 ..... 9.025
GreenBay,Wis. F7 .... 9.025
Hammond,Ind. J5, L2.. 9.025
Hartford,Conn. R2 .... 9.325
Harvey,Ill. R5 ..... 9.025
Lackawanna,N.Y. B3 .. 9.025
LosAngeles P2, S30 .... 11.00
Mansfield,Mass. B5 .... 9.325
Massillon,O. R2, R8 .... 9.025
Midland,Pa. C18 ..... 9.025
Monaca,Pa. S17 ..... 9.025
Newark,N.J. W18 ..... 9.20
Plymouth,Mich. P5 .... 9.225
S.Chicago,Ill. W14 .... 9.025
SpringCity,Pa. K3 .... 9.20



When reliable welding comes first so do M&T Murex Electrodes

THAT HUGE TRACTOR is a mountain of earth-moving muscle capable of 67,000 pounds of pull. An average tractor is dwarfed by this monster: 23 feet long and weighing over 75,000 pounds with equipment. On its seven-roller tracks, it can claw into the earth, push huge boulders, maul tons of dirt.

THE PRINCESS SOPHIE is just as much a giant of the sea lanes. When loaded, it displaces 100,000 tons—more than any passenger or military ship afloat. The latest electronic equipment, a foam fire-protection system, a complete hospital and air-conditioned quarters make it one of the safest, most luxurious supertankers ever.

Another interesting fact about these two giants: both obtained the proper joint strength through welding with M&T Murex electrodes. It's interesting, but not unusual. You'll find that this brand is increasingly in evidence at demanding jobs everywhere. It represents one of the broadest lines in the industry: over 1000 types and sizes for virtually any type of application—as advantageous on the routine jobs as on the extraordinary ones.

To get the whole story on this outstanding line, call in your M&T welding specialist. Or write for your copy of the helpful M&T Murex Electrode Selector.

M&T **welding products** · plating products
minerals · coatings · chemicals · detinning

METAL & THERMIT CORPORATION, General Offices: Rahway, New Jersey

Struthers,O. Y1 .....9.025
Warren,O. C17 .....9.025
Waukegan,Ill. A7 ....9.025
Willimantic,Conn. J5 ..9.325
Worcester,Mass. A7 ...9.325
Youngstown F3, Y1 ....9.025

BARS, Reinforcing, Billet (To Fabricators)

AlabamaCity,Ala. R2 ..5.675
Atlanta A11 .....5.25
Birmingham C15 .....5.25
Buffalo R2 .....5.675
Cleveland R2 .....5.675
Ecorse,Mich. G5 .....5.675
Emeryville,Calif. J7 ...6.425
Fairfield,Ala. T2 .....5.675
Fairless,Pa. U5 .....5.825
Fontana,Calif. K1 ....6.375
Ft. Worth,Tex.(26) T4 ..5.50
Gary,Ind. U5 .....5.675
Houston S5 .....5.675
Ind.Harbor,Ind. I-2, Y1.5.675
Johnstown,Pa. B2 ....5.675
Joliet,Ill. P22 .....5.675
KansasCity,Mo. S5 ....5.675
Kokomo,Ind. C16 .....5.775
Lackawanna,N.Y. B2..5.675
LosAngeles B3 .....6.375
Madison,Ill. L1 .....5.875
Milton,Pa. M18 .....5.825
Minnequa,Colo. C10 ...6.125
Niles,Calif. P1 .....6.375
Pittsburg,Calif. C11 ..6.375
Pittsburgh J5 .....5.675
Portland,Oreg. O4 ....6.425
SandSprings,Okla. S5 ..5.675
Seattle A24, B3, N14 ..6.425
S.Chicago,Ill. R2, W14.5.675
S.Duquesne,Pa. U5 ....5.675
S.SanFrancisco B3 ....6.425
SparrowsPoint,Md. B2..5.675
Steelton,Pa. B2 .....5.675
Sterling,Ill.(1) N15 ...5.675
Sterling,Ill. N15 .....5.775
Struthers,O. Y1 .....5.675
Tonawanda,N.Y. B12 ...6.10
Torrance,Calif. C11 ..6.375
Youngstown R2, U5 ..5.675

BARS, Reinforcing, Billet (Fabricated: to Consumers)

Baltimore B2 .....7.42
Boston B2, U8 .....8.15
Chicago U8 .....7.41
Cleveland U8 .....7.39
Houston S5 .....7.35
Johnstown,Pa. B2 .....7.33
KansasCity,Mo. S5 ....7.35
Lackawanna,N.Y. B2 ...7.35
Marion,O. P11 .....6.70
Newark,N.J. U8 .....7.80
Philadelphia U8 .....7.63
Pittsburgh J5, U8 .....7.25
SandSprings,Okla. S5 ...7.35
Seattle A24, B3, N14 ..7.95
SparrowsPoint,Md. B2 ..7.33
St.Paul U8 .....8.17
Williamsport,Pa. S19 ..7.25

BARS, Wrought Iron

Economy,Pa.(S.R.)B14 15.10
Economy,Pa.(D.R.)B14 19.30
Econ.(DirectRolled)B14 13.55
Economy(Staybolt)B14 19.80
McK.Rks.(S.R.) L5 ...14.50
McK.Rks.(D.R.) L5 ...19.80
McK.Rks.(Staybolt)L5. 20.95

BARS, Rail Steel

ChicagoHts.(3) C2, I-2.5.575
ChicagoHts.(4)(44) I-2.5.675
ChicagoHts.(4) C2 ....5.675
Franklin,Pa.(3) F5 ....5.575
Franklin,Pa.(4) F5 ....5.675
JerseyShore,Pa.(3) J8 ..5.55
Marion,O.(3) P11 ....5.575
Tonawanda(3) B12 ....5.575
Tonawanda(4) B12 ....6.10

SHEETS

SHEETS, Hot-Rolled Steel (18 Gage and Heavier)

AlabamaCity,Ala. R2 ...5.10
Allenport,Pa. P7 .....5.10
Aliquippa,Pa. J5 .....5.10
Ashland,Ky.(8) A10 ....5.10
Cleveland J5, R2 .....5.10
Conshohocken,Pa. A3 ..5.15
Detroit(8) M1 .....5.10
Ecorse,Mich. G5 .....5.10
Fairfield,Ala. T2 .....5.10
Fairless,Pa. U5 .....5.15
Farrell,Pa. S3 .....5.10
Fontana,Calif. K1 ....5.825
Gary,Ind. U5 .....5.10
Geneva,Utah C11 .....5.20
GraniteCity,Ill.(8) G4 ..5.20
Ind.Harbor,Ind. I-2, Y1.5.10
Irvin,Pa. U5 .....5.10
Lackawanna,N.Y. B2 ..5.10
Mansfield,O. E6 .....5.10
Munhall,Pa. U5 .....5.10
Newport,Ky. A2 .....5.10
Niles,O. M21, S3 .....5.10
Pittsburg,Calif. C11 ....5.80
Pittsburgh J5 .....5.10
Portsmouth,O. P12 .....5.10
Riverdale,Ill. A1 .....5.10
Sharon,Pa. S3 .....5.10
S.Chicago,Ill. U5, W14..5.10
SparrowsPoint,Md. B2 ..5.10
Steubenville,O. W10 ....5.10
Warren,O. R2 .....5.10
Weirton,W.Va. W6 ....5.10
Youngstown U5, Y1 ....5.10

SHEETS, H.R. (19 Ga. & Lighter)

Niles,O. M21, S3 .....6.275

SHEETS, H.R. Alloy

Gary,Ind. U5 .....8.40
Ind.Harbor,Ind. Y1 ....8.40
Irvin,Pa. U5 .....8.40
Munhall,Pa. U5 .....8.40
Newport,Ky. A2 .....8.40
Youngstown U5, Y1 ....8.40

SHEETS, H.R. (14 Ga. & Heavier) High-Strength, Low-Alloy

Aliquippa,Pa. J5 .....7.525
Ashland,Ky. A10 .....7.525
Cleveland J5, R2 .....7.525
Conshohocken,Pa. A3 ..7.575
Ecorse,Mich. G5 .....7.525
Fairfield,Ala. T2 .....7.525
Fairless,Pa. U5 .....7.575
Farrell,Pa. S3 .....7.525
Fontana,Calif. K1 ....8.25
Gary,Ind. U5 .....7.525
Ind.Harbor,Ind. I-2, Y1 7.525
Irvin,Pa. U5 .....7.525
Lackawanna(35) B2 ...7.525
Munhall,Pa. U5 .....7.525
Niles,O. S3 .....7.525
Pittsburgh J5 .....7.525
S.Chicago,Ill. U5, W14.7.525
Sharon,Pa. S3 .....7.525
SparrowsPoint(36) B2..7.525
Warren,O. R2 .....7.525
Weirton,W.Va. W6 ....7.525
Youngstown U5, Y1 ...7.525

SHEETS, Hot-Rolled Ingot Iron (18 Gage and Heavier)

Ashland,Ky.(8) A10 ...5.35
Cleveland R2 .....5.875
Warren,O. R2 .....5.875

SHEETS, Cold-Rolled Ingot Iron

Cleveland R2 .....7.05
Middletown,O. A10 ....6.775
Warren,O. R2 .....7.05

SHEETS, Cold-Rolled Steel (Commercial Quality)

AlabamaCity,Ala. R2 ..6.275
Aliquippa,Pa. J5 .....6.275
Allenport,Pa. P7 .....6.275
Cleveland J5, R2 .....6.275
Conshohocken,Pa. A3 ..6.325
Detroit M1 .....6.275
Ecorse,Mich. G5 .....6.275
Fairfield,Ala. T2 .....6.275
Fairless,Pa. U5 .....6.325
Follansbee,W.Va. F4 ...6.275
Fontana,Calif. K1 .....7.40
Gary,Ind. U5 .....6.275
GraniteCity,Ill. G4 ....6.375
Ind.Harbor,Ind. I-2, Y1 6.275
Irvin,Pa. U5 .....6.275
Lackawanna,N.Y. B2 ..6.275
Mansfield,O. E6 .....6.275
Middletown,O. A10 ....6.275
Newport,Ky. A2 .....6.275
Pittsburg,Calif. C11 ..7.225
Pittsburgh J5 .....6.275
Portsmouth,O. P12 ....6.275
SparrowsPoint,Md. B2..6.275
Steubenville,O. W10 ....6.275
Warren,O. R2 .....6.275
Weirton,W.Va. W6 ....6.275
Yorkville,O. W10 ....6.275
Youngstown Y1 .....6.275

SHEETS, Cold-Rolled, High-Strength, Low-Alloy

Aliquippa,Pa. J5 ....9.275
Cleveland J5, R2 .....9.275
Ecorse,Mich. G5 .....9.275
Fairless,Pa. U5 .....9.325
Fontana,Calif. K1 ....10.40
Gary,Ind. U5 .....9.275
Ind.Harbor,Ind. I-2, Y1 9.275
Lackawanna(33) B2 ..9.275
Pittsburgh J5 .....9.275
SparrowsPoint(33) B2..9.275
Warren,O. R2 .....9.275
Weirton,W.Va. W6 ....9.275
Youngstown Y1 .....9.275

SHEETS, Culvert

	Cu Steel	Cu Fe
Ala.City,Ala. R2	7.225	....
Ashland,Ky. A10	7.225	7.475
Canton,O. R2	7.225	....
Fairfield,Ala. T2	7.225	7.475
Gary,Ind. U5	7.225	7.475
GraniteCity,Ill.G4	7.325	....
Ind.Harbor I-2	7.225	7.475
Irvin,Pa. U5	7.225	7.475
Kokomo,Ind. C16	7.325	....
MartinsFry. W10	7.225	7.475
Pitts.,Calif. C11	7.975	....
Pittsburgh J5	7.225	....
SparrowsPt. B2	7.225	....

SHEETS, Culvert—Pure Iron

Ind.Harbor,Ind. I-2 ...7.475

SHEETS, Enameling

Ashland,Ky. A10 .....6.775
Cleveland R2 .....6.775
Fairfield,Ala. T2 .....6.775
Gary,Ind. U5 .....6.775
Ind.Harbor,Ind. I-2, Y1 6.775
Irvin,Pa. U5 .....6.775
Middletown,O. A10 ....6.775
Niles,O. M21, S3 .....6.775
SparrowsPoint,Md. B2..6.775
Youngstown Y1 .....6.775

BLUED STOCK, 29 Gage

Dover,O. E6 .....8.70
Ind.Harbor,Ind. I-2 ....8.70
Mansfield,O. E6 .....8.70
Warren,O. R2 .....8.70
Yorkville,O. W10 .....8.70

SHEETS, Long Terne, Steel

Follansbee,W.Va. W10 .7.225
Gary,Ind. U5 .....7.225
Mansfield,O. E6 .....7.225
Middletown,O. A10 ....7.225
Niles,O. M21, S3 .....7.225
Warren,O. R2 .....7.225

SHEETS, Long Terne, Ingot Iron

Middletown,O. A10 ....7.625

SHEETS, Aluminum Coated

Butler,Pa. A10 (type 1) 9.525
Butler,Pa. A10 (type 2) 9.625
Irvin,Pa. U5 (type 1) ..9.525

SHEETS, Well Casing

Fontana,Calif. K1 ....7.325
Geneva,Utah C11 .....6.80

SHEETS, Galvanized High-Strength, Low-Alloy

Irvin,Pa. U5 .....10.125
Pittsburgh J5 .....10.125
SparrowsPt.(39) B2 ..10.025

SHEETS, Galvannealed Steel

Canton,O. R2 .....7.275
Irvin,Pa. U5 .....7.275

SHEETS, Galvanized Ingot Iron (Hot-Dipped Continuous)

Ashland,Ky. A10 ....7.125
Middletown,O. A10 ....7.125

SHEETS, Electrogalvanized

Cleveland(28) R2 .....7.65
Niles,O.(28) R2 .....7.65
Weirton,W.Va. W6 ....7.50

SHEETS, Galvanized Steel Hot-Dipped

AlabamaCity,Ala. R2..6.875‡
Ashland,Ky. A10 ....6.875‡
Canton,O. R2 .....6.875‡
Dover,O. E6 .....6.875†
Fairfield,Ala. T2 ....6.875†
Gary,Ind. U5 .....6.875†
GraniteCity,Ill. G4 ...6.975*
Ind.Harbor,Ind. I-2 ..6.875†
Irvin,Pa. U5 .....6.875†
Kokomo,Ind. C16 ....6.975‡
MartinsFerry,O. W10..6.875*
Middletown,O. A10 ..6.875†
Pittsburg,Calif. C11 ..7.625*
Pittsburgh J5 .....6.875†
SparrowsPt.,Md. B2 ..6.875†
Warren,O. R2 .....6.875†
Weirton,W.Va. W6 ..6.875*

*Continuous and noncontinuous. †Continuous. ‡Noncontinuous.

Key to Producers

A1 Acme Steel Co.
A2 Acme-Newport Steel Co.
A3 Alan Wood Steel Co.
A4 Allegheny Ludlum Steel
A5 Alloy Metal Wire Div., H. K. Porter Co. Inc.
A6 American Shim Steel Co.
A7 American Steel & Wire Div., U. S. Steel Corp.
A8 Anchor Drawn Steel Co.
A9 Angell Nail & Chaplet
A10 Armco Steel Corp.
A11 Atlantic Steel Co.
A24 Alaska Steel Mills Inc.
A25 Algoma Steel Corp. Ltd.

B1 Babcock & Wilcox
B2 Bethlehem Steel Co.
B3 Bethlehem Steel Co., Pacific Coast Div.
B4 Blair Strip Steel Co.
B5 Bliss & Laughlin Inc.
B8 Braeburn Alloy Steel
B9 Brainard Steel Div., Sharon Steel Corp.
B10 E. & G. Brooke, Wickwire Spencer Steel Div., Colo. Fuel & Iron
B12 Buffalo Steel Corp.
B14 A. M. Byers Co.
B15 J. Bishop & Co.

C1 Calstrip Steel Corp.
C2 Calumet Steel Div., Borg-Warner Corp.
C4 Carpenter Steel Co.
C9 Colonial Steel Co.
C10 Colorado Fuel & Iron
C11 Columbia-Geneva Steel
C12 Columbia Steel & Shaft.
C13 Columbia Tool Steel Co.
C14 Compressed Steel Shaft.
C15 Connors Steel Div., H. K. Porter Co., Inc.
C16 Continental Steel Corp.
C17 Copperweld Steel Co.
C18 Crucible Steel Co.
C19 Cumberland Steel Co.
C20 Cuyahoga Steel & Wire
C23 Charter Wire Inc.
C24 G. O. Carlson Inc.
C32 Carpenter Steel of N.Eng.

D2 Detroit Steel Corp.
D4 Disston Div., H. K. Porter Co. Inc.
D6 Driver-Harris Co.
D7 Dickson Weatherproof Nail Co.
D8 Damascus Tube Co.
D9 Wilbur B. Driver Co.

E1 Eastern Gas&Fuel Assoc.
E2 Eastern Stainless Steel
E6 Empire-Reeves Steel
E10 Enamel Prod. & Plating

F2 Firth Sterling Inc.
F3 Fitzsimmons Steel Co.
F4 Follansbee Steel Corp.
F5 Franklin Steel Div., Borg-Warner Corp.
F6 Fretz-Moon Tube Co.
F7 Ft. Howard Steel & Wire
F8 Ft. Wayne Metals Inc.

G4 Granite City Steel Co.
G5 Great Lakes Steel Corp.
G6 Greer Steel Co.
G8 Green River Steel Corp.

H1 Hanna Furnace Corp.
H7 Helical Tube Co.

I-1 Igoe Bros. Inc.
I-2 Inland Steel Co.
I-3 Interlake Iron Corp.
I-4 Ingersoll Steel Div., Borg-Warner Corp.
I-6 Ivins Steel Tube Works
I-7 Indiana Steel & Wire Co.

J1 Jackson Iron & Steel Co.
J3 Jessop Steel Co.
J4 Johnson Steel & Wire Co.
J5 Jones & Laughlin Steel
J6 Joslyn Mfg. & Supply
J7 Judson Steel Corp.
J8 Jersey Shore Steel Co.

K1 Kaiser Steel Corp.
K2 Keokuk Electro-Metals
K3 Keystone Drawn Steel
K4 Keystone Steel & Wire
K7 Kenmore Metals Corp.

L1 Laclede Steel Co.
L2 LaSalle Steel Co.
L3 Latrobe Steel Co.
L6 Lone Star Steel Co.
L7 Lukens Steel Co.
L8 Leschen Wire Rope Div., H. K. Porter Co. Inc.

M1 McLouth Steel Corp.
M4 Mahoning Valley Steel
M6 Mercer Pipe Div., Sawhill Tubular Products
M8 Mid-States Steel & Wire
M12 Moltrup Steel Products
M14 McInnes Steel Co.
M16 Md. Fine & Specialty Wire Co. Inc.
M17 Metal Forming Corp.
M18 Milton Steel Div., Merritt-Chapman&Scott
M21 Mallory-Sharon Metals Corp.
M22 Mill Strip Products Co.
M23 Mill Strip Products Co. of Pennsylvania

N1 National-Standard Co.
N2 National Supply, Armco Steel Corp.
N3 National Tube Div., U. S. Steel Corp.
N5 Nelsen Steel & Wire Co.
N6 New England High Carbon Wire Co.
N8 Newman-Crosby Steel
N14 Northwest. Steel Rolling Mills Inc.
N15 Northwestern S.&W. Co.
N20 Neville Ferro Alloy Co.

O4 Oregon Steel Mills

P1 Pacific States Steel Corp.
P2 Pacific Tube Co.
P4 Phoenix Steel Corp.
P5 Pilgrim Drawn Steel
P6 Pittsburgh Coke & Chem.
P7 Pittsburgh Steel Co.
P11 Pollak Steel Co.
P12 Portsmouth Div., Detroit Steel Corp.
P13 Precision Drawn Steel
P15 Pittsburgh Metallurgical
P16 Page Steel & Wire Div., American Chain & Cable
P17 Plymouth Steel Corp.
P19 Pitts. Rolling Mills
P20 Prod. Steel Strip Corp.
P22 Phoenix Mfg. Co.
P24 Phil. Steel & Wire Corp.

R2 Republic Steel Corp.
R3 Rhode Island Steel Corp.
R5 Roebling's Sons, John A.
R6 Rome Strip Steel Co.
R8 Reliance Div., Eaton Mfg.
R9 Rome Mfg. Co.
R10 Rodney Metals Inc.

S1 Seneca Wire & Mfg. Co.
S3 Sharon Steel Corp.
S4 Sharon Tube Co.
S5 Sheffield Div., Armco Steel Corp.
S6 Shenango Furnace Co.
S7 Simmons Co.
S8 Simonds Saw & Steel Co.
S12 Spencer Wire Corp.
S13 Standard Forgings Corp.
S14 Standard Tube Co.
S15 Stanley Works
S17 Superior Drawn Steel Co.
S18 Superior Steel Div., Copperweld Steel Co.
S19 Sweet's Steel Co.
S20 Southern States Steel
S23 Superior Tube Co.
S25 Stainless Welded Prod.
S26 Specialty Wire Co. Inc.
S30 Sierra Drawn Steel Div., Bliss & Laughlin Inc.
S40 Seneca Steel Service
S41 Stainless & Strip Div., J & L Steel Corp.
S42 Southern Elec. Steel Co.
S43 Seymour Mfg. Co.
S44 Screw & Bolt Corp. of America
S45 Somers Brass Co.
S46 Steel Co. of Canada

T2 Tenn. Coal & Iron Div., U. S. Steel Corp.
T3 Tenn. Products & Chemical Corp.
T4 Texas Steel Co.
T5 Thomas Strip Div., Pittsburgh Steel Co.
T6 Thompson Wire Co.
T7 Timken Roller Bearing
T9 Tonawanda Iron Div., Am. Rad. & Stan. San.
T13 Tube Methods Inc.
T19 Techalloy Co. Inc.

U3 Union Wire Rope, Armco Steel Corp.
U4 Universal-Cyclops Steel
U5 U. S. Steel Corp.
U6 U. S. Pipe & Foundry
U7 Ulbrich Stainless Steels
U8 U. S. Steel Supply Div., U. S. Steel Corp.
U11 Union Carbide Metals Co.
U13 Union Steel Corp.

V2 Vanadium-Alloy Steel
V3 Vulcan-Kidd Steel Div., H. K. Porter Co.

W1 Wallace Barnes Steel Div., Associated Spring
W2 Wallingford Steel Co.
W3 Washburn Wire Co.
W4 Washington Steel Corp.
W6 Weirton Steel Co.
W8 Western Automatic Machine Screw Co.
W9 Wheatland Tube Co.
W10 Wheeling Steel Corp.
W12 Wickwire Spencer Steel Div., Colo. Fuel & Iron
W13 Wilson Steel & Wire Co.
W14 Wisconsin Steel Div., International Harvester
W15 Woodward Iron Co.
W18 Wyckoff Steel Co.

Y1 Youngstown Sheet & Tube

STRIP

STRIP, Hot-Rolled Carbon

Ala.City,Ala.(27) R2	5.10
Allenport,Pa. P7	5.10
Alton,Ill. L1	5.30
Ashland,Ky.(8) A10	5.10
Atlanta A11	5.10
Bessemer,Ala. T2	5.10
Birmingham C15	5.10
Conshohocken,Pa. A3	5.15
Detroit M1	5.10
Ecorse,Mich. G5	5.10
Fairfield,Ala. T2	5.10
Farrell,Pa. S3	5.10
Fontana,Calif. K1	5.825
Gary,Ind. U5	5.10
Ind.Harbor,Ind. I-2, Y1	5.10
Johnstown,Pa.(25) B2	5.10
Laekaw'na,N.Y.(25) B2	5.10
LosAngeles(25) B3	5.85
LosAngeles C1	8.60
Minnequa,Colo. C10	6.20
Riverdale,Ill. A1	5.10
SanFrancisco S7	6.60
Seattle(25) B3	6.10
Seattle N14	6.60
Sharon,Pa. S3	5.10
S.Chicago,Ill. W14	5.10
S.SanFrancisco(25) B3	5.85
SparrowsPoint,Md. B2	5.10
Torrance,Calif. C11	5.85
Warren,O. R2	5.10
Weirton,W.Va. W6	5.10
Youngstown U5	5.10

STRIP, Hot-Rolled Alloy

Carnegie,Pa. S18	8.40
Farrell,Pa. S3	8.40
Gary,Ind. U5	8.40
Houston S5	8.65
Ind.Harbor,Ind. Y1	8.40
KansasCity,Mo. S5	8.65
LosAngeles B3	9.60
Lowellville,O. S3	8.40
Newport,Ky. A2	8.40
Sharon,Pa. A2, S3	8.40
S.Chicago,Ill. W14	8.40
Youngstown U5, Y1	8.40

STRIP, Hot-Rolled High-Strength, Low-Alloy

Ashland,Ky. A10	7.575
Bessemer,Ala. T2	7.575
Conshohocken,Pa. A3	7.575
Ecorse,Mich. G5	7.575
Fairfield,Ala. T2	7.575
Farrell,Pa. S3	7.575
Gary,Ind. U5	7.575
Ind.Harbor,Ind. I-2, Y1	7.575
Lackawanna,N.Y. B2	7.575
LosAngeles(25) B3	8.325
Seattle(25) B3	8.575
Sharon,Pa. S3	7.575
S.Chicago,Ill. W14	7.575
S.SanFrancisco(25) B3	8.325
SparrowsPoint,Md. B2	7.575
Warren,O. R2	7.575
Weirton,W.Va. W6	7.575
Youngstown U5, Y1	7.575

STRIP, Hot-Rolled Ingot Iron

Ashland,Ky.(8) A10	5.35
Warren,O. R2	5.875

STRIP, Cold-Rolled Carbon

Anderson,Ind. G6	7.425
Baltimore T6	7.425
Boston T6	7.975
Buffalo S40	7.425
Cleveland A7, J5	7.425
Dearborn,Mich. S3	7.425
Detroit D2, M1, P20	7.425
Dover,O. G6	7.425
Evanston,Ill. M22	7.525
Farrell,Pa. S3	7.425
Follansbee,W.Va. W10	7.425
Fontana,Calif. K1	9.20
FranklinPark,Ill. T6	7.525
Ind.Harbor,Ind. Y1	7.425
Indianapolis S41	7.575
LosAngeles C1, S41	9.30
McKeesport,Pa. E10	7.525
NewBedford,Mass. R10	7.875
NewBritain,Conn. S15	7.875
NewCastle,Pa. B4, M23	7.425
NewHaven,Conn. D2	7.875
NewKensington,Pa. A6	7.425
Pawtucket,R.I. R3, N8	7.975
Philadelphia P24	7.875
Pittsburgh J5	7.425
Riverdale,Ill. A1	7.525
Rome,N.Y.(32) R6	7.425
Sharon,Pa. S3	7.425
Trenton,N.J.(31) R5	8.875
Warren,O. R2, T5	7.425
Worcester,Mass. A7	7.975

STRIP, Cold-Rolled Alloy

Boston T6	15.90
Cleveland A7	15.55
Carnegie,Pa. S18	15.55
Dover,O. G6	15.55
Farrell,Pa. S3	15.55
FranklinPark,Ill. T6	15.55
Harrison,N.J. S18	15.55
Indianapolis S41	15.70
LosAngeles S41	17.75
Lowellville,O. S3	15.55
Pawtucket,R.I. N8	15.90
Riverdale,Ill. A1	15.55
Sharon,Pa. S3	15.55
Worcester,Mass. A7	15.85
Youngstown S41	15.55

STRIP, Cold-Rolled High-Strength, Low-Alloy

Cleveland A7	10.80
Dearborn,Mich. S3	10.80
Dover,O. G6	10.80
Farrell,Pa. S3	10.80
Ind.Harbor,Ind. Y1	10.80
Sharon,Pa. S3	10.80
Warren,O. R2	10.80
Weirton,W.Va. W6	10.80
Youngstown Y1	10.80

STRIP, Galvanized (Continuous)

Farrell,Pa. S3	7.50
Sharon,Pa. S3	7.50

STRIP, Cold-Finished Spring Steel (Annealed)

	0.26-0.40C	0.41-0.60C	0.61-0.80C	0.81-1.05C	1.06-1.35C
Anderson,Ind. G6	9.10	....	....	....	....
Baltimore T6	9.50	10.70	12.90	15.90	18.85
Boston T6	9.50	10.70	12.90	15.90	18.85
Bristol,Conn. W1	....	10.70	12.90	16.10	19.30
Carnegie,Pa. S18	8.95	10.40	12.60	15.60	....
Cleveland A7	8.95	10.40	12.60	15.60	18.55
Dearborn,Mich. S3	9.05	10.50	12.70	....	....
Detroit D2	9.05	10.50	12.70	15.70	....
Dover,O. G6	8.95	10.40	12.60	15.60	18.55
Evanston,Ill. M22	9.05	10.40	12.60	15.60	....
Farrell,Pa. S3	8.95	10.40	12.60	15.60	18.55
Fostoria,O. S1	10.05	10.40	12.60	15.60	....
FranklinPark,Ill. T6	9.05	10.40	12.60	15.80	18.55
Harrison,N.J. C18	....	....	12.90	16.10	19.30
Indianapolis S41	9.10	10.55	12.60	15.60	18.55
LosAngeles C1	11.15	12.60	14.80	17.80	....
LosAngeles S41	11.15	12.60	14.80	....	....
NewBritain,Conn. S15	9.40	10.70	12.90	15.90	18.85
NewCastle,Pa. B4, M23	8.95	10.40	12.60	15.60	....
NewHaven,Conn. D2	9.40	10.70	12.90	15.90	....
NewKensington,Pa. A6	8.95	10.40	12.60	15.60	....
NewYork W3	....	10.70	12.90	16.10	19.30
Pawtucket,R.I. N8	9.50	10.70	12.90	15.90	18.85
Riverdale,Ill. A1	9.05	10.40	12.60	15.60	18.55
Rome,N.Y. R6	8.95	10.40	12.60	15.60	18.55
Sharon,Pa. S3	8.95	10.40	12.60	15.60	18.55
Trenton,N.J. R5	....	10.70	12.90	15.90	18.85
Warren,O. T5	8.95	10.40	12.60	15.60	18.55
Worcester,Mass. A7, T6	9.50	10.70	12.90	15.90	18.85
Youngstown S41	8.95	10.40	12.60	15.60	18.55

Spring Steel (Tempered)

			Up to 0.80C	0.81-1.05C	1.06-1.35C
Bristol,Conn. W1	...	...	18.85	22.95	27.80
Buffalo W12	...	...	18.85	....	....
Fostoria,O. S1	...	...	19.05	22.15	....
FranklinPark,Ill. T6	...	...	19.20	23.30	28.15
Harrison,N.J. C18	...	...	18.85	22.95	27.80
NewYork W3	...	...	18.85	22.95	27.80
Palmer,Mass. W12	...	...	18.85	....	....
Trenton,N.J. R5	...	...	18.85	22.95	27.80
Worcester,Mass. A7, T6	...	...	18.85	22.95	27.80
Youngstown S41	...	...	19.20	23.30	28.15

STRIP, C.R., Electrogalvanized

Cleveland A7	7.425*
Dover,O. G6	7.425*
Evanston,Ill. M22	7.525*
McKeesport,Pa. E10	7.50*
NewCastle,Pa. M23	7.425*
Riverdale,Ill. A1	7.525*
Warren,O. B9, S3, T5	7.425*
Worcester,Mass. A7	7.975
Youngstown S41, Y1	7.425*

*Plus galvanizing extras.

STRIP, Cold-Rolled Ingot Iron

Warren,O. R2	8.175

TIGHT COOPERAGE HOOP

Atlanta A11	5.825
Farrell,Pa. S3	5.525
Riverdale,Ill. A1	5.675
Sharon,Pa. S3	5.525
Youngstown U5	5.525

TIN MILL PRODUCTS

TIN PLATE, Electrolytic (Base Box)

	0.25 lb	0.50 lb	0.75 lb
Aliquippa,Pa. J5	$9.10	$9.35	$9.75
Fairfield,Ala. T2	9.20	9.45	9.85
Fairless,Pa. U5	9.20	9.45	9.85
Fontana,Calif. K1	9.75	10.00	10.40
Gary,Ind. U5	9.10	9.35	9.75
GraniteCity,Ill. G4	9.20	9.45	9.85
IndianaHarbor,Ind. I-2, Y1	9.10	9.35	9.75
Irvin,Pa. U5	9.10	9.35	9.75
Niles,O. R2	9.10	9.35	9.75
Pittsburg,Calif. C11	9.75	10.00	10.40
SparrowsPoint,Md. B2	9.10	9.35	9.75
Weirton,W.Va. W6	9.10	9.35	9.75
Yorkville,O. W10	9.10	9.35	9.75

ELECTROLYTIC TIN-COATED SHEET (Dollars per 100 lb)

Aliquippa,Pa. J5 (21-27 Ga.)	7.90	8.10	....
IndianaHarbor,Ind. Y1 (20-27 Ga.)	7.90	....	....
Niles,O. R2 (20-27 Ga.)	7.90	8.10	8.30

ELECTROLYTIC THIN TIN PLATE (¼ lb coating in coils)

	Base Box 45 lb	50 lb	55 lb	60 lb
Fairfield,Ala. T2	$6.20	$6.35	$6.50	$6.65
Fairless,Pa. U5	6.20	6.35	6.50	6.65
Gary,Ind. U5	6.10	6.25	6.40	6.55
Irvin,Pa. U5	6.10	6.25	6.40	6.55
SparrowsPoint,Md. B2	6.10	6.25	6.40	6.55
Weirton,W.Va. W6	6.10	6.25	6.40	6.55

TIN PLATE,Hot Dipped 1.25 Common Coke

	lb	1.50 lb
Aliquippa,Pa. J5	$10.40	$10.65
Fairfield,Ala. T2	10.50	10.75
Fontana,Calif.K1	11.05	11.30
Gary,Ind. U5	10.40	10.65
Irvin,Pa. U5	10.40	10.65
Pitts.,Calif. C11	11.05	11.30
Sp.Pt.,Md. B2	10.40	10.65
Weirton,W.Va.W6	10.40	10.65
Yorkville,O. W10	10.40	10.65

BLACK PLATE (Base Box)

Aliquippa,Pa. J5	$8.20
Fairfield,Ala. T2	8.30
Fairless,Pa. U5	8.30
Fontana,Calif. K1	8.85
Gary,Ind. U5	8.20
GraniteCity,Ill. G4	8.30
Ind.Harbor,Ind. I-2, Y1	8.20
Irvin,Pa. U5	8.20
Niles,O. R2	8.20
Pittsburg,Calif. C11	8.85
SparrowsPoint,Md. B2	8.20
Weirton,W.Va. W6	8.20
Yorkville,O. W10	8.20

HOLLOWARE ENAMELING (Black Plate) (29 Gage)

Aliquippa,Pa. J5	7.85
Gary,Ind. U5	7.85
GraniteCity,Ill. G4	7.95
Ind.Harbor,Ind. Y1	7.85
Irvin,Pa. U5	7.85
Yorkville,O. W10	7.85

SILICON STEEL

C.R. COILS & CUT LENGTHS (22 Ga.)

Fully Processed (Semiprocessed ½c lower)	Field	Armature	Electric	Motor	Dynamo
BeechBottom,W.Va. W10	....	11.70	12.40	13.35	14.65
Brackenridge,Pa. A4	....	....	12.40	13.35	14.65
GraniteCity,Ill. G4	9.975*	11.30*	12.00*	13.15*	....
IndianaHarbor,Ind. I-2	9.875*	11.20*	11.90*	13.05*	....
Mansfield,O. E6	9.875*	11.70	12.40	13.55	14.65
Newport,Ky. A2	9.875	11.70*	12.40*	13.55*	14.65*
Niles,O. M21	9.875*	11.70	12.40	13.55	....
Vandergrift,Pa. U5	9.875*	11.70	12.40	13.55	14.65
Warren,O. R2	9.875*	11.70	12.40	13.55	14.65
Zanesville,O. A10	....	11.70†	12.40	13.55	14.65

	Stator
Mansfield,O. E6	8.10
Vandergrift,Pa. U5	8.10
Warren,O. R2 (Locore)	8.10

SHEETS (22 Ga., coils & cut lengths)

Fully Processed (Semiprocessed ½c lower)	T-72	T-65	T-58	T-52
BeechBottom,W.Va. W10	15.70	16.30	16.80	17.85
Zanesville,O. A10	15.70	16.30	16.80	17.85
Vandergrift,Pa. U5	15.70	16.30	16.80	17.85

C.R. COILS & CUT LENGTHS (22 Ga.)	Grain Oriented T-100	T-90	T-80	T-73	T-66	T-72
Brackenridge,Pa. A4	....	18.10	19.70	20.20	20.70	15.70††
Butler,Pa. A10	....	....	....	19.70	20.20	20.70	....
Vandergrift,Pa. U5	..	17.10	18.10	19.70	20.20	20.70	15.70
Warren,O. R2	....	....	....	....	....	....	15.70‡

*Semiprocessed. †Fully processed only. ‡Coil annealed; semiprocessed ½c lower. ††Coils only.

WIRE

WIRE, Manufacturers Bright, Low Carbon

AlabamaCity,Ala. R2	8.00
Aliquippa,Pa. J5	8.00
Alton,Ill. L1	8.20
Atlanta A1	8.00
Bartonville,Ill. K4	8.10
Buffalo W12	8.00
Chicago W13	8.00
Cleveland A7, C20	8.00
Crawfordsville,Ind. M8	8.10
Donora,Pa. A7	8.00
Duluth A7	8.00
Fairfield,Ala. T2	8.00
Fostoria,O.(24) S1	8.10
Houston S5	8.25
Jacksonville,Fla. M8	8.35
Johnstown,Pa. B2	8.00
Joliet,Ill. A7	8.00
KansasCity,Mo. S5	8.25
Kokomo,Ind. C16	8.10
LosAngeles B3	8.95
Minnequa,Colo. C10	8.25
Monessen,Pa. P7, P16	8.00
Palmer,Mass. W12	8.30
Pittsburg,Calif. C11	8.95
Portsmouth,O. P12	8.00
S.Chicago,Ill. R2	8.00
S.SanFrancisco C10	8.95
SparrowsPoint,Md. B2	8.10
Sterling,Ill.(1) N15	8.00
Sterling,Ill. N15	8.10
Struthers,O. Y1	8.00
Waukegan,Ill. A7	8.00
Worcester,Mass. A7	8.30

WIRE, Cold Heading Carbon

Elyria,O. W8	8.00

WIRE, Gal'd., for ACSR

Bartonville,Ill. K4	12.65
Buffalo W12	13.40
Cleveland A7	12.65
Donora,Pa. A7	12.65
Duluth A7	12.65
Johnstown,Pa.(10) B2	12.65
KansasCity,Mo. U3	12.90
LosAngeles(2) B3	13.60
Minnequa,Colo. C10	12.775
Monessen,Pa. P7, P16	12.65
Muncie,Ind. I-7	13.60
NewHaven,Conn. A7	12.95
Palmer,Mass. W12	13.70
Pittsburg,Calif. C11	13.45
Portsmouth,O. P12	12.65
Roebling,N.J. R5	12.95
SparrowsPt.,Md.(10)B2	12.75
Struthers,O. Y1	13.40
Trenton,N.J. A7	12.95
Waukegan,Ill. A7	12.65
Worcester,Mass. A7	12.95

WIRE, Upholstery Spring

Aliquippa,Pa. J5	9.75
Alton,Ill. L1	9.95
Buffalo W12	9.75
Cleveland A7	9.75
Donora,Pa. A7	9.75
Duluth A7	9.75
Johnstown,Pa. B2	9.75
KansasCity,Mo. S5, U3	10.00
Kokomo,Ind. C16	9.85
Los Angeles B3	10.70
Minnequa,Colo. C10	9.95
Monessen,Pa. P7, P16	9.75
NewHaven,Conn. A7	10.05
Palmer,Mass. W12	10.05
Pittsburg,Calif. C11	10.70
Portsmouth,O. P12	9.75
Roebling,N.J. R5	10.05
S.Chicago,Ill. R2	9.75
S.SanFrancisco C10	10.70
SparrowsPt.,Md. B2	9.85
Struthers,O. Y1	9.75
Trenton,N.J. A7	10.05
Waukegan,Ill. A7	9.75
Worcester,Mass. A7	10.05

WIRE, MB Spring, High-Carbon

Aliquippa,Pa. J5	9.75
Alton,Ill. L1	9.95
Bartonville,Ill. K4	9.85
Buffalo W12	9.75
Cleveland A7	9.75
Donora,Pa. A7	9.75
Duluth A7	9.75
Fostoria,O. S1	9.80
Johnstown,Pa. B2	9.75
KansasCity,Mo. S5, U3	10.00
LosAngeles B3	10.70
Milbury,Mass.(12) N6	10.05
Minnequa,Colo. C10	9.95
Monessen,Pa. P7, P16	9.75
Muncie,Ind. I-7	9.95
Palmer,Mass. W12	10.05
Pittsburg,Calif. C11	10.70
Portsmouth,O. P12	9.75
Roebling,N.J. R5	10.05
S.Chicago,Ill. R2	9.75
S.SanFrancisco C10	10.70
SparrowsPt.,Md. B2	9.85
Struthers,O. Y1	9.75
Trenton,N.J. A7	10.05
Waukegan,Ill. A7	9.75
Wor'ster,Mass.A7,J4,T6	10.05

WIRE, Fine & Weaving(8" Coils)

Alton,Ill. L1	16.50
Bartonville,Ill. K4	16.40
Chicago W13	16.30
Cleveland A7	16.30
Crawfordsville,Ind. M8	16.40
Fostoria,O. S1	16.30
Houston S5	16.55
Jacksonville,Fla. M8	16.65
Johnstown,Pa. B2	16.30
KansasCity,Mo. S5	16.55
Kokomo,Ind. C16	16.30
Minnequa,Colo. C16	16.55
Monessen,Pa. P16	16.30
Muncie,Ind. I-7	16.50
Palmer,Mass. W12	16.60
S.SanFrancisco C10	17.15
Waukegan,Ill. A7	16.30
Worcester,Mass. A7, J6	16.60

ROPE WIRE (A)

Bartonville,Ill. K4	13.45
Buffalo W12	13.45
Fostoria,O. S1	13.45
Johnstown,Pa. B2	13.45
Monessen,Pa. P7	13.45
Muncie,Ind. I-7	13.65
Palmer,Mass. W12	13.75
Portsmouth,O. P12	13.45
Roebling,N.J. R5	13.75
St.Louis L8	13.45
SparrowsPt.,Md. B2	13.55
Struthers,O. Y1	13.45
Worcester,Mass. J4	13.75

(A) Plow and Mild Plow; add 0.25c for Improved Plow.

WIRE, Tire Bead

Bartonville,Ill. K4	17.15
Monessen,Pa. P16	17.15
Roebling,N.J. R5	17.65

WIRE, Cold-Rolled Flat

Anderson,Ind. G6	12.35
Baltimore T6	12.65
Boston T6	12.65
Buffalo W12	12.35
Chicago W13	12.45
Cleveland A7	12.35
Crawfordsville,Ind. M8	12.35
Dover,O. G6	12.35
Evanston,Ill. M22	12.45
Farrell,Pa. S3	12.35
Fostoria,O. S1	12.35
FranklinPark,Ill. T6	12.45
Kokomo,Ind. C16	12.35
Massillon,O. R8	12.35
Milwaukee C23	12.55
Monessen,Pa. P7, P16	12.35
NewCastle,Pa. M23	12.35
Palmer,Mass. W12	12.65
Pawtucket,R.I. N8	12.65
Philadelphia P24	12.65
Riverdale,Ill. A1	12.45
Rome,N.Y. R6	12.35
Sharon,Pa. S3	12.35
Trenton,N.J. R5	12.65
Warren,O. B9	12.35
Worcester,Mass. A7,T6	12.65

NAILS, Stock Sizes

	Col.
AlabamaCity, Ala. R2	173
Aliquippa,Pa. J5	173
Atlanta A11	173
Bartonville,Ill. K4	175
Chicago W13	173
Cleveland A9	173
Crawfordsville,Ind. M8	175
Donora,Pa. A7	173
Duluth A7	173
Fairfield,Ala. T2	173
Houston S5	178
Jacksonville,Fla. M8	175
Johnstown,Pa. B2	173
Joliet,Ill. A7	173
KansasCity,Mo. S5	178
Kokomo,Ind. C16	175
Minnequa,Colo. C10	178
Monessen,Pa. P7	173
Pittsburg,Calif. C11	192
Rankin,Pa. A7	173
S.Chicago,Ill. R2	173
SparrowsPt.,Md. B2	175
Sterling,Ill.(7) N15	175
Worcester,Mass. A7	179

(To Wholesalers: per cwt)

Galveston,Tex. D7	$10.30

NAILS, CUT (100 lb kegs)

Wheeling,W.Va. W10	$10.10

POLISHED STAPLES

	Col.
AlabamaCity,Ala. R2	175
Aliquippa,Pa. J5	173
Atlanta A11	173
Bartonville,Ill. K4	175
Crawfordsville,Ind. M8	177
Donora,Pa. A7	173
Duluth A7	173
Fairfield,Ala. T2	173
Houston S5	180
Jacksonville,Fla. M8	177
Johnstown,Pa. B2	*173*
Joliet,Ill. A7	173
KansasCity,Mo. S5	180
Kokomo,Ind. C16	177
Minnequa,Colo. C10	178
Pittsburg,Calif. C11	194
Rankin,Pa. A7	173
S.Chicago,Ill. R2	175
SparrowsPt.,Md. B2	*175*
Sterling,Ill.(7) N15	175
Worcester,Mass. A7	179

TIE WIRE, Automatic Baler (14½ Ga.) (per 97 lb Net Box) Coil No. 3150

AlabamaCity,Ala. R2	$8.78
Atlanta A11	10.36
Bartonville,Ill. K4	8.88
Buffalo W12	10.26
Chicago W13	9.24
Crawfordsville,Ind. M8	8.88
Donora,Pa. A7	8.78
Duluth A7	8.78
Fairfield,Ala. T2	8.78
Houston S5	10.51
Jacksonville,Fla. M8	8.88
Johnstown,Pa. B2	8.78
Joliet,Ill. A7	8.78
KansasCity,Mo. S5	10.51
Kokomo,Ind. C16	8.88
LosAngeles B3	9.44
Minnequa,Colo. C10	9.02
Pittsburg,Calif. C11	9.44
S.Chicago,Ill. R2	8.78
S.SanFrancisco C10	9.94
SparrowsPt.,Md. B2	8.88
Sterling,Ill.(37) N15	8.88

Coil No. 6500 Stand.

AlabamaCity,Ala. R2	$9.06
Atlanta A11	10.70
Bartonville,Ill. K4	9.16
Buffalo W12	10.60
Chicago W13	9.54
Crawfordsville,Ind. M8	9.16
Donora,Pa. A7	9.06
Duluth A7	9.06
Fairfield,Ala. T2	9.06
Houston S5	10.85
Jacksonville,Fla. M8	9.16
Johnstown,Pa. B2	9.06
Joliet,Ill. A7	9.06
KansasCity,Mo. S5	10.85
Kokomo,Ind. C16	9.16
LosAngeles B3	9.75
Minnequa,Colo. C10	9.30
Pittsburg,Calif. C11	9.75
S.Chicago,Ill. R2	9.06
S.SanFrancisco C10	10.26
SparrowsPt. Md. B2	9.16
Sterling,Ill.(37) N15	9.16

Coil No. 6500 Interim

AlabamaCity,Ala. R2	$9.11
Atlanta A11	10.75
Bartonville,Ill. K4	9.21
Buffalo W12	10.65
Chicago W13	9.59
Crawfordsville,Ind. M8	9.21
Donora,Pa. A7	9.11
Duluth A7	9.11
Fairfield,Ala. T2	9.11
Houston S5	10.90
Jacksonville,Fla. M8	9.21
Johnstown,Pa. B2	9.11
Joliet,Ill. A7	9.11
KansasCity,Mo. S5	10.96
Kokomo,Ind. C16	9.21
LosAngeles B3	9.80
Minnequa,Colo. C10	9.35
Pittsburg,Calif. C11	9.80
S.Chicago,Ill. R2	9.11
S.SanFrancisco C10	10.31
SparrowsPt., Md. B2	9.21
Sterling,Ill.(37) N15	9.21

BALE TIES, Sing'e Loop Coil.

AlabamaCity,Ala. R2	212
Atlanta A11	212
Bartonville,Ill. K4	214
Crawfordsville,Ind. M8	214
Donora,Pa. A7	212
Duluth A7	212
Fairfield,Ala. T2	212
Houston S5	217
Jacksonville,Fla. M8	214
Joliet,Ill. A7	212
KansasCity,Mo. S5	217
Kokomo,Ind. C16	214
Minnequa, Colo. C10	217
SparrowsPt.,Md. B2	214
Sterling,Ill.(7) N15	214

FENCE POSTS Col.

Birmingham C15	177
Chicago Hts.,Ill. C2, I-2	177
Duluth A7	177
Franklin,Pa. F5	177
Johnstown,Pa. B2	177
Marion,O. P11	177
Minnequa,Colo. C10	182
Tonawanda,N.Y. B12	177

WIRE, Barbed Col.

AlabamaCity,Ala. R2	193**
Aliquippa,Pa. J5	190§
Atlanta A11	197*
Bartonville,Ill. K4	199
Crawfordsville,Ind. M8	198
Donora,Pa. A7	193†
Duluth A7	193†
Fairfield,Ala. T2	193†
Houston S5	198**
Jacksonville,Fla. M8	198
Johnstown,Pa. B2	196§
Joliet,Ill. A7	193†
KansasCity,Mo. S5	198**
Kokomo,Ind. C16	195†
Minnequa,Colo. C10	198**
Monessen,Pa. P7	196§
Pittsburg,Calif. C11	213†
Rankin,Pa. A7	193†
S.Chicago,Ill. R2	193**
SparrowsPoint,Md. B2	198§
Sterling,Ill.(7) N15	198

WIRE (16 gage)	An'ld Stone	Galv. Stone
Ala.City,Ala.R2	17.85	19.40**
Ali'ppa,Pa. J5	17.85	19.65
Bartonville K4	17.95	19.80
Chicago W13	17.85	....
Cleveland A7	17.85	....
Craw'sville M8	17.95	19.80‡‡
Fostoria,O. S1	18.35	19.90†
Houston S5	18.10	19.65**
Jacksonville M8	18.95	19.80‡‡
Johnstown B2	17.85	19.65§
Kan.City,Mo. S5	18.10	....
Kokomo C16	17.95	19.50†
Minnequa C10	18.10	19.65**
P'lm'r,Mass. W12	18.15	19.70†
Pitts.,Calif. C11	18.20	19.75†
S.SanFran. C10	18.20	19.75**
St'ling(37) N15	17.95	19.80
SparrowsPt. B2	17.95	19.75§
Waukegan A7	17.85	19.40†
Worcester A7	18.15	....

WOVEN FENCE, 9-15 Ga. Col.

Ala.City, Ala. R2	187**
Aliq'ppa,Pa.9-11½ga. J5	190§
Atlanta A11	191*
Bartonville,Ill. K4	193
Crawfordsville,Ind. M8	192
Donora,Pa. A7	187†
Duluth A7	187†
Fairfield,Ala. T2	187†
Houston S5	192**
Jacksonville,Fla. M8	192
Johnstown,Pa.(42) B2	190§
Joliet,Ill. A7	187†
KansasCity,Mo. S5	192**
Kokomo,Ind. C16	189†
Minnequa,Colo. C10	192**
Pittsburg,Calif. C11	210†
Rankin,Pa. A1	187†
S.Chicago,Ill. R2	187**
Sterling,Ill.(7) N15	192

WIRE, Merchant Quality (6 to 8 gage) An'ld Galv.

Ala.City,Ala. R2	9.00	9.55**
Aliquippa J5	8.65	9.325§
Atlanta (48) A11	9.00	9.75*
Bartonville(48)K4	9.85	19.90
Buffalo W12	9.00	9.55†
Chicago W13	9.00	9.55**
Cleveland A7	9.00	....
Crawfordsville M8	9.10	9.80††
Donora,Pa. A7	9.00	9.55†
Duluth A7	9.00	9.55†
Fairfield T2	9.00	9.55†
Houston(48) S5	9.25	9.80**
Jack'ville,Fla. M8	9.10	9.80‡‡
Johnstown(48) B2	9.00	9.675§
Joliet,Ill. A7	9.00	9.55†
KansasCity(48)S5	9.25	9.80**
Kokomo(48) S16	9.10	9.65†
LosAngeles B3	9.95	10.625§
Minnequa C10	9.25	9.80**
Monessen(48) P7	8.65	9.35§
Palmer,Mass. W12	9.30	9.85†
Pitts.,Calif. C11	9.95	10.50†
Rankin,Pa. A7	9.00	9.55†
S.Chicago R2	9.00	9.55**
S.SanFran. C10	9.95	10.50**
Spar'wsPt.(48)B2	9.10	9.775§
St'ling(37)(48)N15	9.10	9.80
Struthers,O. Y1	9.00	9.65‡
Worcester,Mass.A7	9.30	9.85†

Based on zinc prices of: *13.50c. †5c. §10c. ‡Less than 10c. ††10.50c. ‡‡11.00c. **Subject to zinc equalization extras.

RIVETS

F.o.b. Cleveland and/or freight equalized with Pittsburgh, f.o.b. Chicago and/or freight equalized with Birmingham except where equalization is too great.

Structural ½ in., larger 12.85

7/16 in. and smaller by 6 in. and shorter: 15% off list.

FASTENERS

(Consumer discounts per cent off list prices, orders for 1 container for assorted sizes; for less than container quantities, add 25 per cent; attaching nuts to bolts, package sizes, add 7.5 per cent; heavy hex nut 1⅛ in. through 1½ in. tapped 8 threads, add 10 per cent)

HEX HEAD CAP SCREWS, coarse, or fine thread, packaged or bulk, with or without hex nuts, 1020 steel bright and high carbon heat treated, ¼ in. thru 1 in. diam., listed lengths:

Plain Finish	50
Hot Galvanized and Zinc Plated:	
Packaged	43.75
Bulk	50

BOLTS, Standard stock sizes:

Plain Finish	50
Hot Galvanized and Zinc Plated:	
Packaged	43.75
*Bulk	50

*Hot galvanized or zinc plated lag bolts only — for package or bulk quantities use applicable list less bulk discounts.

CAP AND SETSCREWS,

Fillister Head, Cap Screws, Coarse Thread:

Packaged	+55
Bulk	+16

Flat Head Cap Screws:

¾ in. and smaller, 6 in. and shorter:	
Packaged	+85
Bulk	+38

Setscrews, Square Head, Cup Point, Coarse Thread:

Through 1 in. diam., 6 in. and shorter:	
Packaged	+ 5
Bulk	19
Through 1 in. diam., longer than 6 in.:	
Packaged	+29

HEXAGON NUTS: American Standard: Finished hex, hex jam, and hex slotted coarse or fine thread, ¼ in. through 3 in., finished hex thick, thick and slotted, castle, fine thread, ¼ in. through 1½ in., semifinished hex heavy, heavy and jam, heavy and slotted, coarse thread, ¼ in. through 4 in., and

SQUARE NUTS, American Standard: Regular square and heavy square, coarse thread, ¼ in. through 2 in.:

Plain Finish	50
Hot Galvanized and Zinc Plated:	
Packaged	43.75
Bulk	50

PRESTRESSED STRAND

(High strength, stress relieved; 7 wire uncoated. Net prices per 1000 ft, 40,000 lb and over)

	Standard Diameter, Inches				
	1/4	5/16	3/8	7/16	1/2
Buffalo W12	$26.20	$38.50	$47.90	$61.30	$80.30
KansasCity,Mo. U3	26.20	38.50	47.90	61.30	80.30
Minnequa,Colo. C10	26.20	38.50	47.00	61.30	80.30
Pittsburg,Calif. C11	26.20	38.50	47.90	61.30	80.30
Roebling,N.J. R5	26.20	38.50	47.90	61.30	80.30
SparrowsPoint,Md. B2	26.20	38.50	47.90	61.30	80.30
St.Louis L8	26.20	38.50	47.90	61.30	80.30
Waukegan,Ill. A7	26.20	38.50	47.90	61.30	80.30

BOILER TUBES

Net base c.l. prices, dollars per 100 ft, mill; minimum wall thickness, cut length 10 to 24 ft, inclusive.

O.D. In.	B.W. Gage	Seamless H.R.	Seamless C.D.	Elec. Weld H.R.
1	13	....	27.24	23.13
1¼	13	....	32.25	24.41
1½	13	30.42	35.65	26.98
1¾	13	35.94	42.12	31.89
2	13	40.28	47.21	35.74
2¼	13	45.36	53.17	40.26
2¼	12	49.24	57.72	43.70
2½	12	54.23	63.57	48.13
2¾	12	58.73	68.83	52.13
3	12	62.62	73.40	55.59

RAILWAY MATERIALS

Rails	Standard No. 1	Standard No. 2	All No. 2	Tee Rails 60 lb Under
Bessemer,Pa. U5	5.75	5.65	....	6.725
Ensley,Ala. T2	5.75	5.65	....	6.725
Fairfield,Ala. T2	....	....	....	6.725
Gary,Ind. U5	5.75	5.65	....	....
Huntington,W.Va. C15	....	....	....	6.725
Johnstown,Pa. B2	....	....	....(16)	6.725
Lackawanna,N.Y. B2	5.75	5.65	....	6.725
Minnequa,Colo. C10	5.75	5.65	....	7.225
Steelton,Pa. B2	5.75	5.65	....	....
Williamsport,Pa. S19	....	....	....	6.725

TIE PLATES

Fairfield,Ala. T2	6.875
Gary,Ind. U5	6.875
Lackawanna,N.Y. B2	6.875
Minnequa,Colo. C10	6.875
Seattle B3	7.025
Steelton,Pa. B2	6.875
Torrance,Calif. C11	7.025

JOINT BARS

Bessemer,Pa. U5	7.25
Fairfield,Ala. T2	7.25
Joliet,Ill. U5	7.25
Lackawanna,N.Y. B2	7.25
Minnequa,Colo. C10	7.25
Steelton,Pa. B2	7.25

AXLES

Ind.Harbor,Ind. S13	9.125
Johnstown,Pa. B2	9.125

SCREW SPIKES

Lebanon,Pa. B2	15.10

TRACK BOLTS, Untreated

Cleveland R2	15.35
KansasCity,Mo. S5	15.35
Lebanon,Pa. B2	15.35
Minnequa,Colo. C10	15.35
Pittsburgh S44	15.35
Seattle B3	15.85

STANDARD TRACK SPIKES

Fairfield,Ala. T2	10.10
Ind.Harbor,Ind. I-2, Y1	10.10
KansasCity,Mo. S5	10.10
Lebanon,Pa. B2	10.10
Minnequa,Colo. C10	10.10
Pittsburgh J5	10.10
Seattle B3	10.60
S.Chicago,Ill. R2	10.10
Struthers,O. Y1	10.10
Youngstown R2	10.10

Footnotes

(1) Chicago base.
(2) Double galvanized.
(3) Merchant.
(4) Reinforcing.
(5) 1⅛ to under 1 7/16 in.; 1 7/16 to under 1 15/16 in.; 6.70c; 1 15/16 to 8 in., inclusive, 7.05c.
(6) Limited analyses only.
(7) Chicago base 2 cols. lower.
(8) 16 Ga. and heavier.
(9) Merchant quality; add 0.35c for special quality.
(10) Bethany A coating.
(12) Worcester, Mass., base.
(15) ⅝" and thinner.
(16) 40 lb and under.
(17) Flats only; 0.25 in. & heavier.
(23) Special quality.
(24) Deduct 0.05c, finer than 15 Ga.
(25) Bar mill bands.
(26) Deld. in mill zone, 5.65c.
(27) Bar mill sizes.
(28) Bonderized.
(30) Sheared; for universal mill add 0.45c.
(31) Widths over ⅝ in.; 7.375c, for widths ⅝ in. and under by 0.125 in. and thinner.
(32) Buffalo base.
(33) 14 Ga., 48 in.
(35) 72" and narrower.
(36) 54" and narrower.
(37) Chicago base, 10 points lower.
(38) 13 Ga. & lighter; 60" & narrower.
(39) 48" and narrower.
(43) 9-14½ Ga.
(44) To fabricators.
(48) 6-7 Ga.
(49) 3½ in. and smaller rounds and 2½ in. and smaller hexagons; 9.65c for larger rounds and hexagons and other shapes.

SEAMLESS STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Size—Inches	2		2½		3		3½		4		5		6	
List Per Ft	37c		58.5c		76.5c		92c		$1.09		$1.48		$1.92	
Pounds Per Ft	3.68		5.82		7.62		9.20		10.89		14.81		19.18	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	+12.25	+28.75	+5.75	+23.5	+3.25	+21	+1.75	+19.5	+1.75	+19.5	+2	+19.75	0.5	+17.25
Ambridge, Pa. N2	+12.25	....	+5.75	....	+3.25	....	+1.75	....	+1.75	....	+2	....	0.5	....
Lorain, O. N3	+12.25	+28.75	+5.75	+23.5	+3.25	+21	+1.75	+19.5	+1.75	+19.5	+2	+19.75	0.5	+17.25
Youngstown Y1	+12.25	+28.75	+5.75	+23.5	+3.25	+21	+1.75	+19.5	+1.75	+19.5	+2	+19.75	0.5	+17.25

ELECTRICWELD STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Youngstown R2	+12.25	+28.75	+5.75	+23.5	+3.25	+21	+1.75	+19.5	+1.75	+19.5	+2	+19.75	0.5	+17.25

BUTTWELD STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Size—Inches	⅛		¼		⅜		½		¾		1		1¼	
List Per Ft	5.5c		6c		6c		8.5c		11.5c		17c		23c	
Pounds Per Ft	0.24		0.42		0.57		0.85		1.13		1.68		2.28	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	....	....	....	....	....	....	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25
Alton, Ill. L1	....	....	....	....	....	....	0.25	+17	3.25	+13	6.75	+8.5	9.25	+7.25
Benwood, W. Va. W10	1.5	+27	+10.5	+36	+21	+45.5	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25
Butler, Pa. F6	4.5	+24	+8.5	+34	+19.5	+44	....	....	....	....	....	....	....	....
Etna, Pa. N2	....	....	....	....	....	....	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25
Fairless, Pa. N3	....	....	....	....	....	....	0.25	+17	3.25	+13	6.75	+8.5	9.25	+7.25
Fontana, Calif. K1	....	....	....	....	....	....	+10.75	+28	+7.75	+24	+4.25	+19.5	+1.75	+18.25
Indiana Harbor, Ind. Y1	....	....	....	....	....	....	1.25	+16	4.25	+12	7.75	+7.5	10.25	+6.25
Lorain, O. N3	....	....	....	....	....	....	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25
Sharon, Pa. S4	4.5	+24	+8.5	+34	+19.5	+44	....	....	....	....	....	....	....	....
Sharon, Pa. M6	....	....	....	....	....	....	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25
Sparrows Pt., Md. B2	2.5	+26	+10.5	+36	+21.5	+46	0.25	+17	3.25	+13	6.75	+8.5	9.25	+7.25
Wheatland, Pa. W9	4.5	+24	+8.5	+34	+19.5	+44	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25
Youngstown R2, Y1	....	....	....	....	....	....	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25

Size—Inches	1½		2		2½		3		3½		4	
List Per Ft	27.5c		37c		58.5c		76.5c		92c		$1.09	
Pounds Per Ft	2.75		3.68		5.82		7.62		9.20		10.89	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	3.25	+14.5	3.25	+14.5
Alton, Ill. L1	9.75	+6.25	10.25	+5.75	11.75	+5.5	11.75	+5.5	1.25	+16.5	1.25	+16.5
Benwood, W. Va. W10	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	3.25	+14.5	3.25	+14.5
Etna, Pa. N2	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	3.25	+14.5	3.25	+14.5
Fairless, Pa. N3	9.75	+6.25	10.25	+5.75	11.75	+5.5	11.75	+5.5	1.25	+16.5	1.25	+16.5
Fontana, Calif. K1	+1.25	+17.25	+0.75	+16.75	0.75	+16.5	0.75	+16.5	+9.75	+27.5	+9.75	+27.5
Indiana Harbor, Ind. Y1	10.75	+5.25	11.25	+4.75	12.75	+4.5	12.75	+4.5	2.25	+15.5	2.25	+15.5
Lorain, O. N3	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	....	....	....	....
Sharon, Pa. M6	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	....	....	....	....
Sparrows Pt., Md. B2	9.75	+6.25	10.25	+5.75	11.75	+5.5	11.75	+5.5	1.25	+16.5	1.25	+16.5
Wheatland, Pa. W9	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	3.25	+14.5	3.25	+14.5
Youngstown R2, Y1	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	3.25	+14.5	3.25	+14.5

*Galvanized pipe discounts based on price of zinc at 12.00s, East St. Louis.

Stainless Steel

Representative prices, cents per pound; subject to current lists of extras

AISI Type	Rerolling: Ingot	Rerolling: Slabs	Forging Billets	H.R. Strip	H.R. Rods; C.F. Wire	Bars; Structural Shapes	Plates	Sheets	C.R. Strip; Flat Wire
201	22.75	25.00	....	36.00	....	43.50	39.25	48.50	45.00
202	24.75	28.25	37.75	39.00	42.25	44.50	40.00	49.25	49.25
301	24.00	26.00	38.75	37.25	43.50	46.00	41.25	51.25	47.50
302	26.25	29.50	39.50	40.50	44.25	46.75	42.25	52.00	52.00
302B	26.50	30.75	42.25	45.75	46.75	49.00	44.50	57.00	57.00
303	....	33.25	42.50	....	47.25	49.75	45.00	56.75	56.75
304	28.00	29.50	39.50	40.50	44.25	46.75	45.75	52.00	52.00
304L	....	37.25	47.25	48.25	52.00	54.50	53.50	59.75	59.75
305	29.50	34.75	44.00	47.50	47.00	49.50	46.25	58.75	58.75
308	32.00	36.25	49.00	50.25	54.75	57.75	55.25	63.00	63.00
309	41.25	47.50	60.00	64.50	66.25	69.50	66.00	80.50	80.50
310	51.50	59.50	81.00	84.25	89.75	94.50	87.75	96.75	96.75
314	....	....	80.50	....	89.75	94.50	87.75	....	104.25
316	41.25	47.50	64.50	68.50	71.75	75.75	71.75	80.75	80.75
316L	....	55.25	72.25	76.25	79.50	83.50	79.50	88.50	88.50
317	49.75	58.00	79.75	88.25	89.50	94.25	88.50	101.00	101.00
321	33.50	38.00	48.75	53.50	54.50	57.50	54.75	65.50	65.50
330	....	....	123.25	....	98.75	143.75	135.00	149.25	149.25
18-8 CbTa	38.50	48.25	57.75	63.50	63.75	67.25	64.75	79.25	79.25
403	....	....	29.25	....	33.25	35.00	30.00	40.25	40.25
405	20.25	26.50	30.75	36.00	34.75	36.50	32.50	46.75	46.75
410	17.50	19.50	29.25	31.00	33.25	35.00	30.00	40.25	40.25
416	....	....	29.75	....	33.75	35.50	31.25	48.25	48.25
420	....	31.50	35.50	41.75	40.75	42.75	40.25	62.00	62.00
430	17.75	19.75	29.75	32.00	33.75	35.50	31.00	40.75	40.75
430F	....	....	30.50	....	34.25	36.00	31.75	51.75	51.75
431	....	29.75	39.25	....	43.50	46.00	41.00	56.00	56.00
446	....	....	40.75	59.00	46.00	48.25	42.75	70.00	70.00

Producers Are: Allegheny Ludlum Steel Corp.; American Steel & Wire Div., U. S. Steel Corp.; Anchor Drawn Steel Co., division of Vanadium-Alloys Steel Co.; Armco Steel Corp.; Babcock & Wilcox Co.; Bethlehem Steel Co.; J. Bishop & Co.; A. M. Byers Co.; Calstrip Steel Corp.; G. O. Carlson Inc.; Carpenter Steel Co.; Carpenter Steel Co. of New England; Charter Wire Products; Crucible Steel Co. of America; Damascus Tube Co.; Dearborn Div., Sharon Steel Corp.; Wilbur B. Driver Co.; Driver-Harris Co.; Eastern Stainless Steel Corp.; Firth Sterling Inc.; Fort Wayne Metals Inc.; Green River Steel Corp., subsidiary of Jessop Steel Co.; Indiana Steel & Wire Co.; Ingersoll Steel Div., Borg-Warner Corp.; Ellwood Ivins Steel Tube Works Inc.; Jessop Steel Co.; Johnson Steel & Wire Co. Inc.; Stainless & Strip Div., Jones & Laughlin Steel Corp.; Joslyn Stainless Steels, division of Joslyn Mfg. & Supply Co.; Latrobe Steel Co.; Lukens Steel Co.; Maryland Fine & Specialty Wire Co. Inc.; McLouth Steel Corp.; Metal Forming Corp.; Midvale-Heppenstall Co.; National Standard Co.; National Tube Div., U. S. Steel Corp.; Pacific Tube Co.; Page Steel & Wire Div., American Chain & Cable Co. Inc.; Pittsburgh Rolling Mills Inc.; Republic Steel Corp.; Riverside-Alloy Metal Div., H. K. Porter Company Inc.; Rodney Metals Inc.; Sawhill Tubular Products Inc.; Sharon Steel Corp.; Simonds Saw & Steel Co.; Somers Brass Co.; Specialty Wire Co. Inc.; Standard Tube Co.; Superior Steel Div., Copperweld Steel Co.; Superior Tube Co.; Swepco Tube Corp.; Techalloy Co. Inc.; Timken Roller Bearing Co.; Trent Tube Co., subsidiary of Crucible Steel Co. of America; Tube Methods Inc.; Ulbrich Stainless Steel Inc.; Union Steel Corp.; U. S. Steel Corp.; Universal Cyclops Steel Corp.; Vanadium-Alloys Steel Co.; Wall Tube & Metal Products Co.; Wallingford Steel, subsidiary of Allegheny Ludlum Steel Corp.; Washington Steel Corp.; Seymour Mfg. Co.

Clad Steel

	Plates: Carbon Base 5%	10%	15%	20%	Sheets Carbon Base 20%
Stainless					
302	....	....	....	....	37.50
304	26.05	28.80	31.55	34.30	39.75
304L	30.50	33.75	36.95	40.15	....
316	38.20	42.20	46.25	50.25	58.25
316L	42.30	46.75	51.20	55.65	....
316 Cb	49.90	55.15	60.40	65.65	....
321	31.20	34.50	37.75	41.05	47.25
347	36.90	40.80	44.65	48.55	57.00
405	22.25	24.60	26.90	29.25	....
410	20.55	22.70	24.85	27.00	....
430	21.20	23.45	25.65	27.90	....
Inconel	49.80	61.35	72.80	84.40	....
Nickel	43.20	55.05	66.95	78.90	....
Nickel, Low Carbon	43.50	55.70	67.95	80.35	....
Monel	44.25	55.35	66.45	77.60	....

	Strip, Carbon Base —Cold Rolled— 10%	Both Sides
*Copper**	*36.10*	*43.00*

*Deoxidized. Production points: Stainless-clad sheets, New Castle, Ind. I-4; stainless-clad plates, Claymont, Del. P4; Coatesville, Pa. L7; New Castle, Ind. I-4, and Washington, Pa. J3; nickel, inconel, monel-clad plates, Coatesville L7; copper-clad strip, Carnegie, Pa. S18.

Tool Steel

Grade	$ per lb	Grade	$ per lb
Reg. Carbon (W-1)	0.330	Hi-Carbon-Cr (D-11)	0.965
Spec. Carbon (W-1)	0.385	V-Cr Hot Work (H-13)	0.550
Oil Hardening (O-1)	0.505	W-Cr Hot Work (H-12)	0.530
V-Cr Hot Work (H-11)	0.505	W Hot Wk (H-21)	1.425-1.44

Grade by Analysis (%) W	Cr	V	Co	Mo	AISI Designation	$ per lb
18	4	1	....	....	T-1	1.840
18	4	2	....	....	T-2	2.005
13.5	4	3	....	....	T-3	2.105
18.25	4.25	1	4.75	....	T-4	2.545
18	4	2	9	....	T-5	2.915
20.25	4.25	1.6	12.95	....	T-6	4.330
13.75	3.75	2	5	....	T-8	2.485
1.5	4	1	....	8.5	M-1	1.200
6.4	4.5	1.9	....	5	M-2	1.345
6	4	3	....	6	M-3	1.590

Tool steel producers include: A4, A8, B2, B8, C4, C9, C12, C18, F2, J3, L3, M14, S8, U4, V2, and V3.

Pig Iron

Prices in dollars per gross ton, f.o.b. (rail) furnace; add 50 cents when shipped by truck. Maximum delivered prices are approximate and based on rail shipment.

Birmingham District	Basic	No. 2 Foundry	Malle-able	Besse-mer
Birmingham R2	62.00	62.50**	66.50	....
Birmingham U6	....	62.50**	66.50	....
Woodward, Ala. W15	62.00*	62.50**	66.50	....
Cincinnati, deld.	....	70.20	....	....
Buffalo District				
Buffalo H1, R2	66.00	66.50	67.00	67.50
N. Tonawanda, N.Y. T9	....	66.50	67.00	67.50
Tonawanda, N.Y. W12	66.00	66.50	67.00	67.50
Boston, deld.	77.29	77.79	78.29	....
Rochester, N.Y., deld.	69.02	69.52	70.02	....
Syracuse, N.Y., deld.	70.12	70.62	71.12	....
Chicago District				
Chicago I-3	66.00	66.50	66.50	67.00
S. Chicago R2	66.00	66.50	66.50	67.00
S. Chicago, Ill. W14	66.00	....	66.50	67.00
Milwaukee, deld.	68.81	69.31	69.31	69.81
Muskegon, Mich., deld.	....	74.46	74.46	....
Cleveland District				
Cleveland R2, A7	66.00	66.50	66.50	67.00
Akron, Ohio, deld.	69.52	70.02	70.02	70.52
Mid-Atlantic District				
Birdsboro, Pa. B10	68.00	68.50	69.00	69.50
Chester, Pa. P4	Nom.	Nom.	Nom.	....
Swedeland, Pa. A3	68.00	68.50	69.00	69.50
NewYork, deld.	....	75.41	75.91	....
Newark, N.J., deld.	72.53	73.03	73.53	74.03
Philadelphia, deld.	70.18	70.68	71.18	71.68
Troy, N.Y., R2	68.00	68.50	69.00	69.50
Boston, deld.	75.20	75.70	76.20	76.70
Pittsburgh District				
NevilleIsland, Pa. P6	66.00	66.50	66.50	67.00
Pittsburgh (N&S sides), deld.	....	68.31	68.31	68.81
Monaca, Pa., deld.	....	68.33	68.33	68.83
Lawrenceville, W. Homestead, Wilmerding, Pa., deld.	....	68.68	68.68	69.18
Verona, Trafford, Pa., deld.	68.83	69.33	69.33	69.83
Brackenridge, Pa., deld.	69.16	69.66	69.66	70.16
Midland, Pa. C15	66.00	....	....	....
Youngstown District				
Hubbard, Ohio Y1	....	....	66.50	....
Sharpsville, Pa. S6	66.00	....	66.50	67.00
Youngstown Y1	....	....	66.50	....

Other U. S. Districts	Basic	No. 2 Foundry	Malle-able	Besse-mer
Duluth I-3	66.00	66.50	66.50	67.00
Erie, Pa. I-3	66.00	66.50	66.50	67.00
Fontana, Calif. K1	75.00	75.50	....	....
Geneva, Utah C11	66.00	66.50	....	....
GraniteCity, Ill. G4	67.90	68.40	68.90	....
Ironton, Utah C11	66.00	66.50	....	....
Minnequa, Colo. C10	68.00	68.50	69.00	....
Rockwood, Tenn. T3	62.00	62.50‡	66.50	67.00
Toledo, Ohio I-3	66.00	66.50	66.50	67.00
Cincinnati, deld.	72.94	73.44	....	....
Mansfield, Ohio, deld.	....	....	71.34	....
Canadian District				
Hamilton, Ont. S46	65.00	65.00	65.50	....
PortColborne, Ont. A25	65.00	65.00	65.50	66.00
SaultSte. Marie, Ont. A25	65.00	65.00	65.50	66.00

*Phos. 0.70-0.90%; Phos. 0.30-0.69%, $63.
**Phos. 0.70-0.90%; Phos. 0.30-0.69%, $63.50.
‡Phos. 0.50% up; Phos. 0.30-0.49%, $63.50.

PIG IRON DIFFERENTIALS

Silicon: Add 75 cents per ton for each 0.25% Si or percentage thereof over base grade, 1.75-2.25%, except on low phos. iron on which base is 1.75-2.00%.

Manganese: Add 50 cents per ton for each 0.25% manganese over 1% or portion thereof.

BLAST FURNACE SILVERY PIG IRON, Gross Ton

(Base 6.01-6.50% silicon; add 75c for each 0.50% silicon or portion thereof over the base grade within a range of 6.50 to 13%; starting with silicon over 13% add $1 per ton for each 0.50% silicon or portion thereof up to 14%; over 14%, price is $93 with $1 differential; add $1 for each 0.50% Mn over 1%)

Buffalo H1	$79.25
Jackson, Ohio I-3, J1	78.00
PortColborne, Ont. A25	78.50
Toledo, Ohio I-3	78.00

ELECTRIC FURNACE SILVERY IRON, Gross Ton

(Base 14.01-14.50% silicon; add $1 for each 0.5% Si to 18%; $1.25 for each 0.50% Mn over 1%; $2 per gross ton premium for 0.045% max P)

CalvertCity, Ky. P15	$99.00
NiagaraFalls, N.Y. P15	99.00
Keokuk, Iowa Open-hearth & Fdry. K2	89.00
Keokuk, Iowa O.H. & Fdry. 12½ lb piglets, 16% Si, K2	92.00

LOW PHOSPHORUS PIG IRON, Gross Ton

Birdsboro, Pa. B10 (Phos. 0.075% max)	$73.00
Lyles, Tenn. T3 (Phos. 0.035% max)	73.00
Rockwood, Tenn. T3 (Phos. 0.035% max)	73.00
Buffalo H1 (Intermediate) (0.036-0.075% max)	71.50
Cleveland A7 (Intermediate) (Phos. 0.036-0.075% max)	71.00
Duluth I-3 (Intermediate) (Phos. 0.036-0.075% max)	71.00
Erie, Pa. I-3 (Intermediate) (Phos. 0.036-0.075% max)	71.00
NevilleIsland, Pa. P6 (Intermediate) (Phos. 0.036-0.075% max)	71.00
Swedeland, Pa. A3 (Intermediate) (Phos. 0.036-0.075% max)	71.00
Troy, N.Y. R2 (Phos. 0.075% max)	73.00

Steel Service Center Products

Representative prices, cents per pound, f.o.b. warehouse, for 2000 lb items (except stainless) ordered by themselves. Prices will vary with total weight of the order or weight of the individual items or both. Base quantities for stainless sheets: 8000 lb, except in Chicago, New York, Boston, Los Angeles, and San Francisco, 10,000 lb. City delivery charges are 15 cents per 100 lb except: Denver, 20 cents; Baltimore, Boston, New York, Philadelphia, San Francisco, 10 cents; Atlanta, Birmingham, Dallas, Houston, Los Angeles, Seattle, no charge.

	SHEETS				STRIP	BARS			STRUCTURAL	PLATES	
	Hot Rolled	Cold Rolled	Galv.	Stainless Type 302	Hot Rolled	H.R. Rounds	C.F. Rounds	H.R. Alloy 4140	SHAPES	Carbon	Floor
Atlanta	9.37	10.61	11.83	....	10.85	9.53	13.24	....	9.94	9.73	11.16
Baltimore	7.77	9.61	10.06	....	10.18	8.55	11.70	16.38	9.03	8.34	10.02
Birmingham	9.43	10.20	10.46	....	10.41	8.26	13.14	16.76	8.47	8.41	10.05
Boston	9.67	10.58	11.77	53.50	12.16	9.77	13.35	16.59	10.16	9.62	11.08
Buffalo	8.55	9.30	11.25	55.98	11.00	8.75	11.45	16.30	9.15	8.65	11.10
Charlotte, N. C.	9.87	11.22	10.30	....	10.86	9.67	12.68	....	9.88	9.82	11.46
Chicago	8.57	10.20	10.15	52.00	10.74	8.55	10.65	15.95	8.91	8.41	10.68
Cincinnati	9.34	10.26	10.75	65.30	11.71	9.33	11.53	16.27	10.14	9.44	11.68
Cleveland	8.57	9.98	10.92	56.18	10.86	8.66	11.25	16.06	9.30	8.65	10.92
Dallas	9.62	10.05	11.75	....	10.57	9.03	12.98	16.95	9.26	9.35	11.97
Detroit	9.48	10.46	11.05	52.00	11.76	9.53	11.01	16.23	10.14	9.43	11.61
Denver	9.41	11.77	12.11	....	9.86	10.10	11.47	....	10.02	9.89	11.83
Houston	9.22	9.65	11.35	52.00	10.78	8.63	13.10	16.55	8.86	8.95	10.60
Indianapolis	9.66	10.64	11.14	....	11.83	9.66	11.09	16.39	10.01	9.50	11.79
Kansas City	9.21	10.87	11.35	....	10.87	9.31	11.57	15.72	9.80	9.10	....
Los Angeles	9.50	11.20	12.20	61.27	11.20	9.55	14.20	17.35	10.45	9.70	11.70
Memphis, Tenn.	8.98	10.05	....	....	10.64	8.82	12.74	....	9.01	8.66	11.41
Milwaukee	8.71	10.34	10.29	....	10.88	8.69	10.89	16.09	9.13	8.55	10.82
Moline, Ill.	8.92	10.55	10.50	....	11.09	8.90	11.00	16.30	9.26	8.76	11.03
Newark, N. J.	9.36	10.13	11.35	....	11.46	9.74	13.25	16.40	10.20	9.51	11.05
New York	9.36	10.13	11.35	52.98	11.46	9.74	13.25	16.40	10.20	9.51	11.00
Philadelphia	8.35	9.60	10.66	52.71	10.35	8.75	11.95	16.38	8.95	8.70	9.95
Pittsburgh	8.57	9.98	11.13	52.00	10.84	8.55	11.25	15.95	8.91	8.41	10.68
Portland, Oreg.	9.45	11.30	12.35	....	11.45	9.45	16.65	17.80	10.05	9.60	11.75
St. Louis	8.77	10.53	11.08	....	10.94	8.77	11.28	16.33	9.14	8.77	10.91
St. Paul	8.84	9.69	10.84	....	11.01	8.82	11.49	16.54	9.18	8.68	10.95
San Francisco	10.17	11.69	11.40	54.00	11.78	10.07	15.10	17.25	10.49	10.38	12.47
Seattle	10.51	11.57	12.50	54.02	11.95	9.94	16.20	17.80	10.65	10.10	12.73
Spokane, Wash.	10.36	11.42	12.35	54.02	11.80	9.79	16.20	17.85	10.50	9.95	12.58

Specifications: Hot rolled sheet, sheared edge, 10 Ga. & 36 x 96-120 in.; cold rolled sheets, 20 Ga. & 36 x 96-120 in.; galvanized sheets, 10 Ga. x 36 x 120 in. except Los Angeles, Dallas and Houston, 10 Ga. x 48 x 120 in.; stainless, 16 Ga. & 36 in.; hot rolled strip, ⅛ in. x 1 in.; hot rolled carbon bars, rounds, ⅝ in.—1¼ in., M1020; cold finished bars, 1 in., C1018; hot rolled alloy bars, 4140 annealed, 1⅝ in.—2⅜ in. rounds; structural shapes, I beams, 6 x 12½ in.; carbon plates, sheared, through ½ in. x 84 in.; floor plates, ¼ in. x 36 in.

Refractories

Fire Clay Brick (per 1000 pieces*)

High-Heat Duty: Ashland, Grahn, Hayward, Hitchins, Haldeman, Olive Hill, Ky., Athens, Troup, Tex., Beech Creek, Clearfield, Curwensville, Lock Haven, Lumber, Orviston, West Decatur, Winburne, Snow Shoe, Pa., Bessemer, Ala., Farber, Mexico, St. Louis, Vandalia, Mo., Ironton, Oak Hill, Parrall, Portsmouth, Ohio, Ottawa, Ill., Stevens Pottery, Ga., Canon City, Colo., $140; Salina, Pa., $145; Niles, Ohio, $146; Cutler, Utah, $175.

Super-Duty: Ironton, Ohio, Vandalia, Mo., Olive Hill, Ky., Clearfield, Salina, Winburne, Snow Shoe, Pa., New Savage, Md., St. Louis, $185; Stevens Pottery, Ga., $195; Cutler, Utah, $248.

Silica Brick (per 1000 pieces*)

Standard: Alexandria, Claysburg, Mt. Union, Sproul, Pa., Ensley, Ala., Pt. Matilda, Pa., Portsmouth, Ohio, Hawstone, Pa., St. Louis, $158; Warren, Niles, Windham, Ohio, Hays, Latrobe, Morrisville, Pa., $163; E. Chicago, Ind., Joliet, Rockdale, Ill., $168; Canon City, Colo., $173; Lehi, Utah, $183; Los Angeles, $185.

Super-Duty: Sproul, Hawstone, Pa., Niles, Warren, Windham, Ohio, Leslie, Md., Athens, Tex., $158; Morrisville, Hays, Latrobe, Pa., $163; E. Chicago, Ind., St. Louis, $168; Canon City, Colo., $183; Curtner, Calif., $185.

Semisilica Brick (per 1000 pieces*)

Woodbridge, N. J., Canon City, Colo., $140; Philadelphia, Clearfield, Pa., $145.

Ladle Brick (per 1000 pieces*)

Dry-Pressed: Alsey, Ill., Chester, New Cumberland, W. Va., Freeport, Johnstown, Merrill Station, Pa., Vandalia, Mo., New Salisbury, Ohio, $97; Vanport, Pa., Wellsville, Irondale, Ohio, $100; Clearfield, Pa., Portsmouth, Ohio, $102; St. Louis, Mexico, Mo., $120.

High-Alumina Brick (per 1000 pieces*)

50 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., Danville, Ill., $250; Philadelphia, $265; Clearfield, Pa., $230; Orviston, Snow Shoe, Pa., $260.

60 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., $310; Danville, Ill., $313; Clearfield, Orviston, Snow Shoe, Pa., $320; Philadelphia, $325.

70 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., $350; Danville, Ill., $353; Clearfield, Orviston, Snow Shoe, Pa., $360; Philadelphia, $365.

Sleeves (per 1000)

St. Louis, $193; Reesdale, Johnstown, Bridgeburg, St. Charles, Pa., $188; Ottawa, Ill., $205.

Nozzles (per 1000)

Reesdale, Johnstown, Bridgeburg, St. Charles, Pa., St. Louis, $310.

Runners (per 1000)

Reesdale, Johnstown, Bridgeburg, St. Charles, Clearfield, Pa., $234.

Dolomite (per net ton)

Domestic, dead-burned bulk, Billmeyer, Blue Bell, Williams, Plymouth Meeting, York, Pa., Millville, W. Va., Bettsville, Millersville, Martin, Woodville, Gibsonburg, Narlo, Ohio, $16.75; Thornton, McCook, Ill., $17; Dolly Siding, Bonne Terre, Mo., $15.00.

Magnesite (per net ton)

Domestic, dead-burned, ⅛ in. grains with fines: Chewelah, Wash., Luning, Nev., $46; ⅜ in. grains with fines: Baltimore (periclase), $73; Pascagoula, Miss. (periclase), $90.

*—9 in. x 4½ x 2.50 straights.

Canadian Steel

(Cents per lb, f.o.b. mill, except as otherwise noted)

Billets, Blooms & Slabs:
- Carbon (N.T.):
  - Forging $97.00
  - Rerolling 78.00
- Alloy (N.T.) 115.00

Wire Rods:
- Carbon 5.70
- Alloy 6.40

Wire (carload lots):
- Merchant annealed .. 8.40
- Low carbon indus. .. 7.20
- Upholstery spring .. 8.55
- M.B. spring 8.85

Bars & Small Shapes:
- Carbon, merchant .. 5.30
- Carbon, special 5.85
- Alloy 6.40

Bar Mill Bands:
- Carbon 5.40
- Alloy 8.05

Bars, Reinforcing 5.30

Structural Shapes:
- Standard carbon ... 5.50
- Angles & zees 5.40

Plates, Carbon:
- Sheared 5.45
- Universal mill 5.10

Sheets & Coils, Hot Rolled:
- Carbon sheet 4.95
- Carbon strip 5.00

Sheets & Coils, Cold Rolled:
- Carbon sheet 6.35
- Carbon strip:
  - (0.080 and lighter) 6.35
  - (0.081 and heavier) 6.65

Sheets & Coils, Galvanized:
- Standard quality ... 6.70
- Culvert quality 7.00

Sheets, Porcelain Enameling 7.45

Sheets & Coils, Electrical:
- Field grade 9.00
- Armature grade 9.50
- Electrical grade 10.15

Sheet Piling 6.15
Skelp 4.70
Rails, Heavy 5.55
Rails, Light 5.70
Joint Bars 6.55
Tie Plates 6.35
Grinding Balls (3 in. diam.) 7.00
Tin Mill Products (Per base box; 100 lb base wt)
- Coke tin plate (1.25 lb pot yield) $10.60
- Electrolytic tin plate (0.25 lb coating). 9.10
- Black plate 8.30

Nails, Wholesale:
- Carload lots .....Col. 110

Fluorspar

Metallurgical grades, f.o.b. shipping point in Ill., Ky., net tons, carloads, effective CaF_2 content 72.5%, $37-$41; 70%, $36-$40; 60%, $33-$36.50. Imported, net ton, f.o.b. cars point of entry, duty paid, metallurgical grade; European, $30-$33, contract; Mexican, all rail, duty paid, $28-$28.50; barge, Brownsville, Tex., $30-$31.

Metal Powder

(Per pound, f.o.b. shipping point in ton lots for minus 100 mesh, except as noted.)

	Cents
Sponge Iron, domestic and foreign, 98% Fe, min. trucklots, freight allowed east of Mississippi River:	
100 mesh, bags	11.50
100 mesh, pails	9.85‡
40 mesh, bags	8.10††
Electrolytic Iron,	
Melting stock, 99.9% Fe, irreg. fragments, ⅛ in. x 1.3 in.	28.75
(In contract lots of 750 tons price is 22.75c.)	
Annealed, 99.5% Fe.	36.75, ton, del. east of Mississippi.
Unannealed (99+% Fe)	33.0
Unannealed (99+% Fe) (minus 325 mesh) ..	58.0
Carbonyl Iron: 90-99.9%, 3 to 20 microns, depending on grade, 88.00-700.00 in standard 200-lb containers; all minus 200 mesh.	
Aluminum: Atomized, 600-lb drum freight allowed, c.l. 39.80; ton lots	41.80
Brass, 80/20, leaded (60 mesh)	*36.50*
Bronze powder, 90/10 ..	*54.20*
Copper, all types	15.25*
Lead	7.50*
Manganese, minus 35 mesh	1.00
Nickel, all types ..	0.78-1.06
Nickel-Silver	*57.90*
Solder	7.50*
Stainless Steel, 304 ..	89.00
Stainless Steel, 316 ..	$1.07
Steel, AISI 4650	32.00
Tin	14.00*
Zinc	*23.20*
	Dollars
Cobalt: 98.5%, minus 100-300 mesh ..	1.57-1.58
99.5%, below 5 microns	2.32
Tungsten	nom.
Molybdenum	4.35

*Plus cost of metal. ‡Depending on mesh. §Cutting and scarfing grades. **Depending on price of ore. ††Welding grade.

Imported Steel

(Base per 100 lb, landed, duty paid; based on current ocean rates with any rise for buyer's acc't. Source of shipment: Western Europe)

	North Atlantic	Great Lakes	South Atlantic	Gulf Coast	West Coast
Deformed Bars, Intermediate, ASTM-A 305 ...	$5.65	$5.90	$5.60	$5.50	$5.80
Bar Size Angles	5.85	6.10	5.80	5.70	6.00
Structural Angles	5.65	5.90	5.60	5.50	5.80
I-Beams	5.60	5.85	5.55	5.45	5.75
Channels	5.60	5.85	5.55	5.45	5.75
Plates (basic bessemer)	5.45	5.80	5.50	5.40	5.70
Sheets, hot rolled and galvanized	Nom.	....	Nom.	Nom.	Nom.
Furring Channels, C.R., 1000 ft, ¾ x 0.30 lb per ft.	25.20	24.70	24.40	24.40	25.20
Barbed Wire (†)	6.50	6.40	6.40	6.20	6.60
Merchant Bars	5.85	6.10	5.80	5.70	6.00
Hot-Rolled Bands	5.95	6.20	5.90	5.80	6.10
Wire Rods, Thomas Commercial No. 5	5.80	5.85	5.75	5.75	6.00
Wire Rods, O. H., No. 5	6.00	6.05	5.95	5.95	6.25
Bright Common Wire Nails (‡)	6.55	6.80	6.50	6.40	6.70

†Per 82 lb net reel. ‡Per 100-lb keg, 20d nails and heavier.

Ores

Lake Superior Iron Ore

(Prices effective for the 1960 shipping season, subject to later revision, gross ton, 51.50% iron natural, rail of vessel, lower lake ports.)

Mesabi bessemer	$11.60
Lump ½ in. and up	12.85
Fines, under ½ in.	10.72
Mesabi nonbessemer	11.45
Old Range bessemer	11.85
Old Range nonbessemer	11.70
Open-hearth lump	12.70
High phos.	11.45

Based on upper lake rail freight rates, lake vessel freight rates, handling and unloading charges, and taxes thereon, which were in effect Jan. 1, 1960; increases or decreases after that date are absorbed by the seller.

Eastern Local Iron Ore

New Jersey, concentrates ..... nom.

Foreign Iron Ore

Cents per unit	
Swedish basic, 65%, c.i.f. Atlantic ports	25.00†
Chilean, 62-65%, c.i.f. Atlantic ports ...	22.00
Brazilian, 68.5% f.o.b. vessel, Victoria, per ton	$11.50

Tungsten Ore

Net ton, unit	
Foreign wolframite, good commercial quality	$19.00-19.50*
Domestic, concentrates, f.o.b. milling points	22.00-23.00

Manganese Ore

Mn 46-48%, Indian, 85-90c, nom. per long ton unit, c.i.f. U. S. ports, duty for buyer's account.

Chrome Ore

Gross ton, f.o.b. cars New York, Philadelphia, Baltimore, Charlestown, S. C., plus ocean freight differential for delivery to Portland, Oreg., Tacoma, Wash.

Indian and Rhodesian

48% 3:1	$34.00-35.00†
48% no ratio	25.00-26.00†

South African Transvaal

44% no ratio	18.75
48% no ratio	24.00-26.00†

Turkish

48% 3:1	35.00-37.00†

Domestic

Rail nearest seller

18% 3:1	30.00

Molybdenum

Sulfide concentrate, per lb of Mo content, mines, unpacked	$1.23

Antimony Ore

Per short ton unit of Sb content, c.i.f. seaboard

55-60%	$2.70-3.20
60-65%	3.25-3.45

Vanadium Ore

Cents per lb V_2O_5	
Domestic	31.00

*Before duty. †Nominal.

Metallurgical Coke

Price per net ton	
Beehive Ovens	
Connellsville, Pa., furnace	$14.75-15.25
Connellsville, Pa., foundry	18.00-18.50
Oven Foundry	
Birmingham, ovens	$30.35
Cincinnati, deld.	33.34
Buffalo, ovens	32.00
Chattanooga, Tenn., ovens	30.80
Detroit, ovens	32.00
Pontiac, Mich., deld.	34.05
Saginaw, Mich., deld.	35.63
Erie, Pa., ovens	32.00
Indianapolis, ovens	31.25
Ironton, Ohio, ovens	30.50
Cincinnati, deld.	33.64
Kearny, N. J., ovens	31.25
Milwaukee, ovens	32.00
Neville Island (Pittsburgh), Pa., ovens.	30.75
New Haven, Conn., ovens	31.00
Painesville, Ohio, ovens	32.00
Cleveland, deld.	34.45
Philadelphia, ovens	31.00
St. Louis, ovens	33.00
St. Paul, ovens	31.25
Chicago, deld.	34.78
Swedeland, Pa., ovens	31.00
Terre Haute, Ind., ovens	31.25

Coal Chemicals

(Representative prices)

Cents per gal f.o.b. tank cars or tank trucks, plant.	
Pure benzene	34.00
Xylene, industrial grade	29.00
Creosote	24.00
Naphthalene, 78 deg.	6.00
Toluene, one deg. (deld. east of Rockies)	25.00
Cents per lb, f.o.b. tank cars or tank trucks, deld.	
Phenol, 90 per cent grade	14.75
Per ton bulk, f.o.b. cars or trucks, plant.	
Ammonium sulfate, regular grade	$32.00

Ferroalloys

MANGANESE ALLOYS

Spiegeleisen: Carlot, 10 lb pigs, per gross ton, Palmerton, Pa., 21-23% Mn, $102.50; 19-21% Mn, 1-3% Si, $100; 16-19% Mn $98. For Neville Island, Pa., prices add $2.50 as of Feb. 1. Lump 35 lb and down: Deduct $2 from 10 lb pig prices at Palmerton.

Standard Ferromanganese: (Mn 74-76%, C 7% approx) base price per net ton, $220, Johnstown, Duquesne, Sheridan, Neville Island, Pa.; Alloy, W. Va.; Ashtabula, Marietta, O.; Rockwood, Tenn.; Houston, Tex.; Sheffield, Ala.; Portland, Oreg. Add or subtract $2 for each 1% or fraction thereof of contained manganese over 76% or under 74%, respectively (Min 79-81%). Lump $228 per net ton, f.o.b. Anaconda, Mont. Add $2.60 for each 1% above 81%; subtract $2.60 for each 1% below 79%, fractions in proportion to nearest 0.1%.

High-Grade Low-Carbon Ferromanganese: (Mn 85-95%). Carload, lump, bulk, max 0.07% C, 35.1c per lb of contained Mn, carload packed 36.4c, ton lots 37.9c, less ton 39.1c. Delivered. Deduct 4c for max 0.15% C grade from above prices, 5.3c for max 0.03% C, 6.6c for max 0.5% C, and 8.1c for max 75% C—max 7% Si. **Special Grade:** (Mn 90% min, C 0.07% max, P 0.06% max). Add 2.05c to the above prices. Spot, add 0.25c.

Medium-Carbon Ferromanganese: (Mn 80-85%, C 1.25-1.5%, Si 1.5% max). Carload, lump, bulk, 24c per lb of contained Mn; packed, carload 25.3c, ton lot 26.9c, less ton 28.1c.

Electrolytic Manganese Metal: Min carload, bulk, 34.25c; 2000 lb to min carload, 37c; less ton, 39c; 50 lb cans, add 0.5c per lb. Premium for hydrogen-removed metal 0.75c per lb. Prices are f.o.b. cars, Knoxville, Tenn., freight allowed to St. Louis or any point east of Mississippi River; or f.o.b. Marietta, O., freight allowed.

Silicomanganese: (Mn 65-68%). Carload, lump, bulk, 1.50% C grade, 18.5-21% Si, 11.6c per lb of alloy. Packed, c.l. 12.8c, ton 13.25c, less ton 14.25c, f.o.b. Alloy, W. Va.; Ashtabula, Marietta, O.; Rockwood, Tenn.; Houston, Tex.; Sheffield, Ala.; Portland, Oreg. For 2% C grade, Si 16-18.5%, deduct 0.3c from above prices. For 3% grade, Si 12.5-16% deduct 0.5c from above prices. Spot, add 0.25c.

TITANIUM ALLOYS

Ferrotitanium, Low-Carbon: (Ti 20-25%, Al 3.5% max, Si 4% max, C 0.10% max). Contract, ton lot, 2" x D, $1.50 per lb of contained Ti; less ton to 300 lb, $1.55. (Ti 38-43%, Al 8% max, Si 4% max, C 0.10% max). Ton lot $1.35, less ton to 300 lb $1.37, f.o.b. Niagara Falls, N. Y., freight allowed to St. Louis.

Ferrotitanium, High-Carbon: (Ti 15-18%, C 6-8%). Contract min c.l. $250 per ton, f.o.b. Niagara Falls, N. Y., freight allowed to destinations east of Mississippi River and north of Baltimore and St. Louis. Spot, $255.

Ferrotitanium, Medium-Carbon: (Ti 17-21%, C 2-4%). Contract,, c.l. $300 per ton, f.o.b. Niagara Falls, N. Y., freight not exceeding St. Louis rate allowed. Spot, $305.

CHROMIUM ALLOYS

High-Carbon Ferrochrome: C.l. lump, bulk, 28.75c per lb of contained Cr. Delivered.

Charge Chrome: Cr 58-65%, C 5-7%, Si 4-6%, S 0.03% max., 20.00c per lb of contained Cr, carlots, lump, bulk, delivered.

Blocking Chrome: Cr 55-63%, C 4-6%, Si 8-12%, 23.50c per lb of contained Cr, delivered in carlots, lump, bulk.

Refined Chrome: Cr 58-65%, C 4.25% max., Si 1.0% max., S 0.03%, 21.00c per lb of contained Cr, carlots, lump, bulk, delivered.

Low-Carbon Ferrochrome (Simplex) Cr 63-66% or 68-71%: C 0.025% max., 31.50c; C 0.010% max., 32.50c per lb of contained Cr, carlots, lump, bulk, delivered.

Cr 68-73%: C 0.25% max., 33.00c. Cr 65-71%: C. 0.05% max., 32.00c; C 0.10% max, 31.75c; C 0.20% max, 31.50c; C 0.50% max, 31.25c; C 1.0% max, 31.00c; C 1.5%, 30.75c; C 2.0% max, 30.50c, carlots, lump, bulk, delivered.

Foundry Ferrochrome, High-Carbon: (Cr 62-66%, C 5-7%, Si 7-10%). C.l., 2" x D, bulk 30.8c per lb of contained Cr. Packed, c.l. 32.4c, ton 34.2c, less ton 35.7c. Delivered. Spot, add 0.25c.

Foundry Ferrosilicon Chrome: (Cr 50-54%, Si 28-32%, C 1.25% max). SM x D, carload, bulk, 20.05c per lb of alloy carload packed 21.25c, ton lot 22.50c, less ton lot 23.70c. Delivered. Spot, add 0.25c.

Ferrochrome-Silicon: Cr 39-41%, Si 42-45%, C 0.05% max, 22.50c per lb contained Cr and 14.60c per lb contained Si; Cr 33-36%, Si 45-48%, C 0.05% max, 22.50c per lb contained Cr, 14.60c per lb contained Si.

Chromium Metal, Electrolytic: Commercial grade (C 99.8% min, metallic basis Fe 0.2% max). Contract, carlot packed, 2" x D plate (above ¼" thick) $1.15 per lb, ton lot $1.17, less ton lot $1.19. Delivered. Spot, add 5c.

VANADIUM ALLOYS

Ferrovanadium: Open hearth grade (V 50-55%, Si 8% max, C 3% max). Contract, any quantity, $3.20 per lb of contained V. Delivered. Spot, add 10c. **Special Grade:** (V 50-55% or 70-75%, Si 2% max, C 0.5% max) $3.30. **High Speed Grade:** (V 50-55% or 70-75%, Si 1.50% max, C 0.20% max) $3.40.

Grainal: Vanadium Grainal No. 1, $1.05 per lb; No. 79, 50c, freight allowed.

Vanadium Oxide: Contract, less carload lot, packed, $1.38 per lb contained V_2O_5 freight allowed. Spot, add 5c.

SILICON ALLOYS

50% Ferrosilicon: Carload, lump, bulk, 14.6c per lb contained Si. Packed, c.l. 17.1c, ton lot 18.55c, less ton 20.20c, f.o.b. Alloy, W. Va.; Ashtabula, Marietta, O.; Chattanooga, Rockwood, Tenn.; Houston, Tex.; Sheffield, Ala.; Keokuk, Iowa; Portland, Oreg. Spot, add 0.45c.

Low-Aluminum 50% Ferrosilicon: (Al 0.40% max). Add 1.45c to 50% ferrosilicon prices.

65% Ferrosilicon: Carload, lump, bulk, 15.75c per lb contained silicon. Packed, c.l. 17.75, ton lot 19.55c, less ton 20.9c. Delivered. Spot, add 0.35c.

75% Ferrosilicon: Carload, lump, bulk, 16.9c per lb of contained Si. Packed, c.l. 18.8c, ton lot 20.45c, less ton 21.7c. Delivered. Spot, add 0.3c.

90% Ferrosilicon: Carload, lump, bulk, 20c per lb of contained Si. Packed, c.l. 21.65c, ton lot 23.05c, less ton 24.1c. Delivered. Spot, add 0.25c.

Silicon Metal: (98% min Si, 1.00% max Fe, 0.7% max Ca). C.l. lump, bulk, 21.5c per lb of Si. Packed, c.l. 23.15c, ton lot 24.45c, less ton 25.45c. Add 0.5c for max 0.03% Ca grade. Add 0.5c for 0.50% Fe grade analyzing 98.25% min Si.

Alsifer: (Approx 20% Al, 40% Si, 40% Fe). Contract, basis f.o.b. Niagara Falls, N. Y., lump, carload, bulk, 9.85c per lb of alloy; ton lots, packed, 10.85c.

ZIRCONIUM ALLOYS

12-15% Zirconium Alloy: (Zr 12-15%, Si 39-43%, C 0.20% max). Contract, c.l., lump, bulk, 9.25c per lb of alloy. Packed, c.l. 10.45c, ton lot 11.6c, less ton 12.45c. Delivered. Spot, add 0.25c.

35-40% Zirconium Alloy: (Zr 35-40%, Si 47-52%, Fe 8-12%, C 0.50% max). Carload, bulk, 26.25c per lb of alloy, carload, lump, packed 27.25c, ton lot 28.4c, less ton 29.65c. Freight allowed. Spot, add 0.25c.

BORON ALLOYS

Ferroboron: 100 lb or more packed (B 17.50% min, Si 1.50% max, Al 0.50% max, C 0.50% max). Contract, 100 lb or more 1" x D, $1.20 per lb of alloy; less than 100 lb $1.30. Delivered. Spot, add 5c. F.o.b. Washington, Pa., prices 100 lb and over are as follows: Grade A (10-14% B) 85c per lb; Grade B (14-18% B) $1.20; Grade C (19% min B) $1.50.

Borosil: (3 to 4% B, 40 to 45% Si). Carload, bulk, lump, or 3" x D, $5.25 per lb of contained B. Packed, carload, $5.40, ton to c.l. $5.50, less ton $5.60. Delivered.

Carbortam: (B 1 to 2%). Lump, carload $320 per ton, f.o.b. Suspension Bridge, N. Y., freight allowed same as high-carbon ferrotitanium.

CALCIUM ALLOYS

Calcium-Manganese-Silicon: (Ca 16-20%, Mn 14-18% and Si 53-59%). Carload, lump, bulk 23c per lb of alloy, carload packed 24.25c, ton lot 26.15c, less ton 27.15c. Delivered. Spot, add 0.25c.

Calcium-Silicon: (Ca 30-33%, Si 60-65%, Fe 1.5-3%). Carload, lump, bulk 24c per lb of alloy, carload packed 25.65c, ton lot 27.95c, less ton 29.45c. Delivered. Spot, add 0.25c.

BRIQUETED ALLOYS

Chromium Briquets: (Weighing approx 3⅜ lb each and containing 2 lb of Cr). Carload, bulk 19.60c per lb of briquet, in bags 20.70c; 3000 lb to c.l. pallets 20.80c; 2000 lb to c.l. in bags 21.90c; less than 2000 lb in bags 22.80c. Delivered. Spot, add 0.25c.

Ferromanganese Briquets: (Weighing approx 3 lb and containing 2 lb of Mn). Carload, bulk 13.7c per lb of briquet; c.l. packed, bags 14.9c; 3000 lb to c.l., pallets 14.9c; 2000 lb to c.l., bags 16.1c; less ton 17c. Delivered. Spot, add 0.25c.

Silicomanganese Briquets: (Weighing approx 3½ lb and containing 2 lb of Mn and approx ½ lb of Si). C.l. bulk 14c per lb briquet; c.l. packed, bags 15.2c; 3000 lb to c.l., pallets 15.2c; 2000 lb to c.l., bags 16.4c; less ton 17.3c. Delivered. Spot, add 0.25c.

Silicon Briquets: (Large size—weighing approx 5 lb and containing 2 lb of Si and small sizes, weighing approx 2½ lb and containing 1 lb of Si). Carload bulk 8c per lb of briquet; packed, bags 9.2c; 3000 lb to c.l., pallets 9.6c; 2000 lb to c.l., bags 10.8c; less ton 11.7c. Delivered. Spot, add 0.25c.

Molybdic-Oxide Briquets: (Containing 2½ lb of Mo each). $1.49 per lb of Mo contained, f.o.b. Langeloth, Pa.

Titanium Briquets: Ti 98.27%, $1 per lb f.o.b. Niagara Falls, N. Y.

TUNGSTEN ALLOYS

Ferrotungsten: (70-80%). $5.25 per lb (all quantities) of contained W. Delivered.

OTHER FERROALLOYS

Ferrocolumbium: (Cb 50-60%, Si 4% max, C 0.1% max). Ton lots 2" x D, $3.45 per lb of contained Cb; less ton lots $3.50 (nominal). Delivered.

Ferrotantalum Columbium: (Cb 44-77% approx, Ta 15% approx, and Cb plus Ta 60% min, C 0.30% max). Ton lots 2" x D, $3.05 per lb of contained Cb plus Ta, delivered; less ton lots, $3.10.

SMZ Alloy: (Si 60-65%, Mn 5-7%, Zr 5-7%, Fe 20% approx). Carload, bulk 19.25c per lb of alloy, c.l. packed ½ in. x 12 M 20.00c, ton lot 21.15c, less ton 22.40c. Delivered. Spot, add 0.25c.

Graphidox No. 4: (Si 48-52%, Ca 5-7%, Ti 9-11%). C.l. packed, 20% per lb of alloy, ton lot 21.15c; less ton lot 22.4c, f.o.b. Niagara Falls, N. Y., freight allowed to St. Louis.

V-5 Foundry Alloy: (Cr 38-42%, Si 17-19%, Mn 8-11%). C.l. packed 18.45c per lb of alloy; ton lot 19.95c; less ton lot 21.20c, f.o.b. Niagara Falls, N. Y., freight allowed to St. Louis.

Siminal: (Approx 20% each Si, Mn, Al; bal Fe). Lump, carload, bulk, 19.25c. Packed c.l. 20.25c; 2000 lb to c.l. 21.25c; less than 2000 lb 21.75c per lb of alloy. Delivered.

Ferrophosphorus: (23-25% based on 24% P content with unitage of $5 for each 1% of P above or below the base). Carload, bulk, f.o.b. sellers' works, Mt. Pleasant, Siglo, Tenn., $120 per gross ton.

Ferromolybdenum: (65-75%). Per lb of contained Mo in 200-lb container, f.o.b. Langeloth and Washington, Pa., $1.76 in all sizes except powdered which is $1.82.

Technical Molybdic-Oxide: Per lb of contained Mo, in cans $1.47; in bags, $1.46, f.o.b. Langeloth and Washington, Pa.

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Snowstorms Cut Scrap Collections

Hampered movement in and out of yards hints of possible supply shortages in the weeks ahead at some consuming points. Buying is paced by steelmaking

Scrap Prices, Page 166

• **Pittsburgh**—The market has a firm tone. Strength is based on reduced supply (bad weather has hampered collections), competition from neighboring districts, and export demand. Brokers are buying on speculation. Bids on most grades of B&O Railroad scrap were up $1 to $2 a ton from last month's. Wheels, not sold in January, went for $41.25—up $5.14 from the December price. Rail crops (18 in. and under) were off $1 a ton.

• **Chicago**—Weak demand for scrap and heavy snow in the Midwest have combined to hold prices. In fact, some evidence of softness has developed.

Steelmakers will do well to hold their January pace this month, and only a moderate pickup is expected in March.

Cast iron grades of scrap are in little better demand as some gray iron jobbing foundries are receiving improved order volume. However, prices are holding at the $2 higher level reached a week ago.

• **Philadelphia** — Domestic scrap buying is a shade better but due more to scarcity of material than to any improvement in consumption. Yard collections have been retarded by bad weather, and consumers with thin inventories are trying to lay in a little more tonnage. Adding to the supply shortage are continued purchases for export.

Domestic prices for electric furnace bundles advanced $1 to $39, delivered. Low phos structurals and plates are higher at $40-$42 delivered, while rail crops are now quoted $50-$52. For the first time in quite a while, borings and turnings are showing a little life. Mixed borings and turnings are now quoted $15, delivered, and shoveling turnings $19.

• **New York**—Brokers' buying prices are unchanged. However, bad weather has sharply retarded shipments, and export demand is strong.

• **Cleveland**—Demand is sluggish, but prices are steady at the recently established higher levels. Steelmaking operations are rising slowly here and in the Valley and are expected to result in a resumption of mill buying soon. Market strength is also being generated by shrinking supplies resulting from curtailed automotive industry operations and limited collections because of bad weather.

• **Detroit**—Brokers and dealers say lack of demand for scrap is holding prices steady. February auto scrap tonnage will be 20 to 25 per cent below advertised lists. Pontiac has indicated a 20 per cent cut in its shipments. Fisher Body plants are reporting similar reductions. Chrysler's lists will also be off that much. The industry is watching the growing activity of foreign brokers who are entering outstate markets to pick up bundles and busheling.

• **Buffalo**—While a few small orders have been placed the last few days by district mills, the market still is largely untested. The leading consumer here has not yet re-entered the market for a substantial tonnage this month, and some observers think it will be March before this mill places any sizable tonnage.

Dealers say the record breaking cold weather of the last two weeks has reduced the movement of scrap, in and out of yards. Processing activities have been minimal. Neither weakness nor strength is indicated in the price structure.

• **Cincinnati**—The market is up $1 to $2 a ton on the steelmaking grades as result of February purchases by two area mills. No. 1 heavy melting is quoted $26.50-$27.50 by brokers, while No. 1 bundles are $27.50-$28.50. Lessened generation of scrap also is a factor for strength.

• **St. Louis**—The market is showing few signs of strength. Mills are willing to take in material at quoted prices, but they are not getting much. Pressure for tonnage for export is growing. Exporters are trying to induce shippers to send their material to New Orleans and Mobile by barge. Gulf exporters are offering better prices than local mills are willing to pay. Lower barge rates go into effect Feb. 15 and this may signal the start of a heavy export movement.

• **Birmingham**—Because the mills are heavily stocked, brokers and

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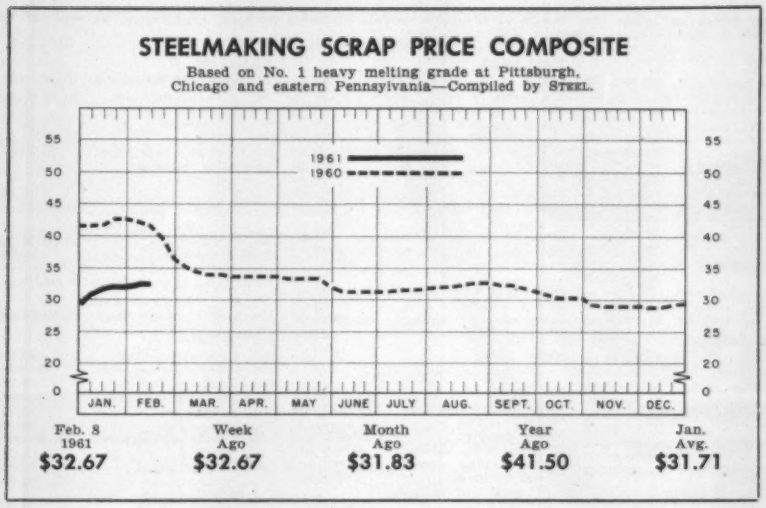


dealers here do not look for much buying this month. Three consumers held up scrap shipments last week. Cast iron scrap is piling up in dealers' yards.

The export market continues to display strength. Dealers along the Gulf Coast are taxed to fill requirements. A Birmingham dealer says local yards can't participate in the export market because of the prohibitive freight to the Port of Mobile.

• **Houston**—Area steel mills continue to operate at reduced rates, but a slight pickup in demand for steel scrap is reported, prices on low phos plates and structurals (2 ft and under) being up $2 to $39-$40. Cargoes of premium grade scrap are moving out of the district to Japan at a steady pace.

• **Los Angeles**—Prices are firm, but the market is quiet. Collections are off, reflecting the generally sluggish market situation, but dealers say there will be no shortage of material. Inquiries indicate demand may increase slightly this month.

• **Seattle**—Demand continues slow. Local buyers are selective, covering only their immediate needs. Expected February price increases have not materialized. The export section of the market is providing the main strength. Shipbreaking is active in the area, but exporters, who are stockpiling, say scrap is not too plentiful.

Additional Japanese commitments are being negotiated. Interest centers largely on obsolete Liberty ships in storage at North Pacific bases. Recent high bids ranged from $56,000 to $57,000 per unit from which an average of 3300 gross tons of plates and machinery are recoverable.

• **San Francisco** — Prices are unchanged. Expectations are they will hold for several weeks in view of sluggish demand.

Iron ore . . .

Iron Ore Prices, Page 161

The purchase of iron ore properties in Nevada has been announced by J. D. McCall, president, Columbia Iron Mining Co., subsidiary of U. S. Steel Corp., Pittsburgh. The action is part of a long range, raw materials requirements program for steelmaking.

Deeds have been recorded at Fallon, Nev., for the transfer of holdings of Mineral Materials Co., Alhambra, Calif., and American Exploration & Mining Co., San Francisco. The properties are in the mineral basin area of Pershing and Churchill Counties, southeast of Lovelock.

The ore properties will provide a new reserve for the western steelmaking furnaces of U. S. Steel's Columbia-Geneva Div. The purchase includes 16 patented lode mining claims and 46 unpatented lode and placer mining claims.

Columbia Iron Mining Co. has also acquired the magnetic ore processing plant of Mineral Materials Co. at Buena Vista Mine on the same property.

Japanese Contract for Big Coking Coal Tonnage

A contract for the sale and shipment of 800,000 tons of coking coal to Japanese steel mills was announced last week by Mt. Rainier Coal Co., owners of the Wilkinson coal mines, 25 miles east of Tacoma, Wash.

The project is on a four year trial basis. Mitsubishi Shoji Kaisha, Tokyo, representing eight Japanese steel plants (including Yawata Iron & Steel Co.) negotiated the contract.

Distributors . . .

Prices, Page 160

Due to fewer working days this month, steel service center operators doubt there will be any general gain in business volume this month. However, a leading distributor in the Philadelphia district estimates there should be a gain on a daily basis of at least 5 to 7 per cent over January's total.

In the Birmingham area, distributors report activity is holding up in the form of inquiries and scattered small orders. Tonnage shipped in the last two weeks is off slightly due mainly to adverse weather. Some fabricators and shops worked only one day last week because of the weather. There was an even greater curtailment in operations in some of the Northeastern areas.

Structural Shapes . . .

Structural Shape Prices, Page 154

Considerable work under construction is being held up by bad weather, but a growing amount of construction is being figured by fabricators. Some shop operators are fairly optimistic over spring prospects. Expectations are that mill order books will start to bulge next month, although it's not expected fabricators will order much steel for inventory. Most of the structural fabricating shops have enough steel on hand to keep them going for some weeks. Plain material deliveries from the mills still run two to four weeks.

Close to 3000 tons of high stress steel involved in a proposed 16-story office building at Portland, Oreg., are being figured. The building is for the Standard Insurance Co.

Iron and Steel Scrap

Consumer prices per gross ton, except as otherwise noted, including brokers' commission, as reported to STEEL, Feb. 8, 1961. *Changes shown in italics.*

STEELMAKING SCRAP COMPOSITE

Feb. 8	$32.67
Feb. 1	32.67
Jan. Avg.	31.71
Feb. 1960	38.87
Feb. 1956	48.96

Based on No. 1 heavy melting grade at Pittsburgh, Chicago, and eastern Pennsylvania.

PITTSBURGH

No. 1 heavy melting	31.00-32.00
No. 2 heavy melting	26.00-27.00
No. 1 dealer bundles	31.00-32.00
No. 2 bundles	25.00-26.00
No. 1 busheling	31.00-32.00
No. 1 factory bundles	38.00-39.00
Machine shop turnings	*13.00-14.00*
Mixed borings, turnings	*13.00-14.00*
Short turnings	*17.00-18.00*
Cast iron borings	*17.00-18.00*
Cut structurals:	
2 ft and under	*34.00-35.00*
3 ft and under	*33.00-34.00*
Heavy turnings	25.00-26.00
Punchings & plate scrap	*38.00-39.00*
Electric furnace bundles	*38.00-39.00*

Cast Iron Grades (F.o.b. shipping point)

No. 1 cupola	*32.00-33.00*
Stove plate	*29.00-30.00*
Unstripped motor blocks	*24.00-25.00*
Clean auto cast	31.00-32.00
Drop broken machinery	44.00-45.00‡

Railroad Scrap

No. 1 R.R. heavy melt.	35.00-36.00
Rails, 2 ft and under	47.00-48.00
Rails, 18 in. and under	48.00-49.00
Random rails	*42.00-43.00*
Angles, splice bars	*38.00-39.00*
Railroad specialties	43.00-44.00
Rails, rerolling	53.00-54.00

Stainless Steel Scrap

18-8 bundles & solids	175.00-180.00
18-8 turnings	95.00-100.00
430 bundles & solids	90.00-95.00
430 turnings	50.00-55.00

CHICAGO

No. 1 hvy melt., indus.	31.00-32.00
No. 1 hvy melt., dealer	29.00-30.00
No. 2 hvy melting	26.00-27.00
No. 1 factory bundles	35.00-36.00
No. 1 dealer bundles	29.00-30.00
No. 2 bundles	19.00-20.00
No. 1 busheling, indus.	*31.00-32.00*
No. 1 busheling, dealer	29.00-30.00
Machine shop turnings	14.00-15.00
Mixed borings, turnings	16.00-17.00
Shovel turnings	16.00-17.00
Cast iron borings	16.00-17.00
Cut structurals, 3 ft	35.00-36.00
Punchings & plate scrap	37.00-38.00

Cast Iron Grades

No. 1 cupola	41.00-42.00
Stove plate	35.00-36.00
Unstripped motor blocks	33.00-34.00
Clean auto cast	46.00-47.00
Drop broken machinery	46.00-47.00

Railroad Scrap

No. 1 R.R. heavy melt.	*32.00-33.00*
R.R. malleable	43.00-44.00
Rails, 2 ft and under	*46.00-47.00*
Rails, 18 in. and under	48.00-49.00
Angles, splice bars	40.00-41.00
Axles	53.00-55.00
Rails, rerolling	54.00-55.00

Stainless Steel Scrap

18-8 bundles, solids	165.00-175.00
18-8 turnings	90.00-95.00
430 bundles & solids	85.00-90.00
430 turnings	45.00-50.00

DETROIT

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	20.00-21.00
No. 2 heavy melting	15.00-16.00
No. 1 bundles	22.00-23.00
No. 2 bundles	12.00-13.00
No. 1 busheling	19.00-20.00
Machine shop turnings	6.00-7.00
Mixed borings, turnings	7.00-8.00
Shovel turnings	8.00-9.00

Cast Iron Grades

No. 1 cupola	29.00-30.00
Stove plate	23.00-24.00
Heavy breakable	22.00-23.00
Unstripped motor blocks	18.00-19.00
Charging box cast	24.00-25.00
Clean auto cast	35.00-36.00

CLEVELAND

No. 1 heavy melting	28.00-29.00
No. 2 heavy melting	19.00-20.00†
No. 1 factory bundles	35.00-36.00
No. 1 bundles	29.50-30.50
No. 2 bundles	16.00-17.00
No. 1 busheling	29.00-30.00
Machine shop turnings	10.00-11.00
Shovel turnings	14.00-15.00
Mixed borings, turnings	14.00-15.00
Cast iron borings	14.00-15.00
Cut foundry steel	31.00-32.00
Cut structurals, plate, 2 ft and under	36.00-37.00
Low phos. punchings & plate	28.00-29.00
Alloy free, short shovel turnings	14.00-15.00
Electric furnace bundles	28.00-29.00

Cast Iron Grades

No. 1 cupola	37.00-38.00
Charging box cast	24.00-25.00
Heavy breakable cast	26.00-27.00
Stove plate	34.00-35.00
Unstripped motor blocks	29.00-30.00
Brake shoes	35.00-36.00
Clean auto cast	43.00-44.00
Burnt cast	30.00-31.00
Drop broken machinery	44.00-45.00

Railroad Scrap

R.R. malleable	42.00-43.00
Rails, 2 ft and under	49.00-50.00
Rails, 18 in. and under	49.00-50.00
Rails, random lengths	41.00-42.00
Cast steel	*39.00-40.00*
No. 1 railroad cast	*45.00-46.00*
Railroad specialties	42.50-43.50
Angles, splice bars	40.50-41.50
Rails, rerolling	53.00-54.00

Stainless Steel Scrap (Brokers' buying prices; f.o.b. shipping point)

18-8 bundles, solids	150.00-155.00
18-8 turnings	65.00-70.00
430 clips, bundles, solids	65.00-70.00
430 turnings	10.00-20.00

YOUNGSTOWN

No. 1 heavy melting	32.00-33.00
No. 2 heavy melting	21.00-22.00
No. 1 busheling	32.00-33.00
No. 1 bundles	33.00-34.00
No. 2 bundles	20.00-21.00
Machine shop turnings	12.00-13.00
Shovel turnings	17.00-18.00
Cast iron borings	17.00-18.00
Low phos.	34.00-35.00
Electric furnace bundles	34.00-35.00

Railroad Scrap

No. 1 R.R. heavy melt.	*35.00-36.00*

BUFFALO

No. 1 heavy melting	27.00-28.00
No. 2 heavy melting	23.00-24.00
No. 1 bundles	27.00-28.00
No. 2 bundles	20.00-21.00
No. 1 busheling	27.00-28.00
Shovel turnings	16.00-17.00
Machine shop turnings	12.00-13.00
Cast iron borings	14.00-15.00
Low phos. structurals and plates, 2 ft and under	37.00-38.00

Cast Iron Grades (F.o.b. shipping point)

No. 1 cupola	36.00-37.00
No. 1 machinery	43.00-44.00

Railroad Scrap

Rails, random lengths	40.00-41.00
Rails, 3 ft and under	46.00-47.00
Rails, rerolling	55.00-56.00
Railroad specialties	39.00-40.00

CINCINNATI

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	*26.50-27.50*
No. 2 heavy melting	*24.50-25.50*
No. 1 bundles	*27.50-28.50*
No. 2 bundles	19.00-20.00
No. 1 busheling	*26.50-27.50*
Machine shop turnings	10.00-11.00
Mixed borings, turnings	11.00-12.00
Shovel turnings	11.00-12.00
Cast iron borings	11.00-12.00
Low phos. 18 in.	*35.00-36.00*

Cast Iron Grades

No. 1 cupola	35.00-36.00
Heavy breakable cast	28.00-29.00
Charging box cast	35.00-36.00
Drop broken machinery	46.00-47.00

Railroad Scrap

No. 1 R.R. heavy melt.	30.00-31.00
Rails, 18 in. and under	44.00-45.00
Rails, random lengths	37.00-38.00

PHILADELPHIA

No. 1 heavy melting	36.00
No. 2 heavy melting	33.00
No. 1 bundles	38.00
No. 2 bundles	23.00
No. 1 busheling	38.00
Electric furnace bundles	*39.00*
Mixed borings, turnings	*15.00*
Shovel turnings	*19.00*
Machine shop turnings	13.00†
Heavy turnings	25.00†
Structurals & plates	*40.00-42.00*
Couplers, springs, wheels	41.00
Rail crops, 2 ft & under	*50.00-52.00*

Cast Iron Grades

No. 1 cupola	38.00
Heavy breakable cast	39.00
Drop broken machinery	48.00-49.00
Malleable	46.00†

NEW YORK

(Brokers' buying prices)

No. 1 heavy melting	27.00-28.00
No. 2 heavy melting	19.00-20.00
No. 1 bundles	27.00-28.00
No. 2 bundles	16.00-17.00
Machine shop turnings	3.50-4.00†
Mixed borings, turnings	4.00-4.50†
Shovel turnings	5.00-6.00†
Low phos. structurals & plates	31.00-32.00†

Cast Iron Grades

No. 1 cupola	34.00-35.00
Unstripped motor blocks	23.00-24.00
Heavy breakable	28.00-29.00

Stainless Steel

18-8 sheets, clips, solids	140.00-145.00
18-8 borings, turnings	70.00-75.00
410 sheets, clips, solids	40.00-45.00
430 sheets, clips, solids	50.00-55.00

BOSTON

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	23.00-24.00
No. 2 heavy melting	19.00-20.00
No. 1 bundles	23.00-24.00
No. 1 busheling	23.00-24.00
Machine shop turnings	5.00-6.00
Shovel turnings	9.00-9.50
No. 1 cast	39.00-40.00
Mixed cupola cast	30.00-30.50
No. 1 machinery cast	40.00-42.00

BIRMINGHAM

No. 1 heavy melting	32.00-33.00
No. 2 heavy melting	22.00-23.00
No. 1 bundles	33.00-34.00
No. 2 bundles	20.00-21.00
No. 1 busheling	32.00-33.00
Cast iron borings	10.00-11.00
Machine shop turnings	15.00-16.00
Shovel turnings	18.00-19.00
Bar crops and plate	37.00-38.00
Structurals & plate	36.00-37.00
Electric furnace bundles	34.00-35.00
Electric furnace:	
3 ft and under	34.00-35.00
2 ft and under	35.00-36.00

Cast Iron Grades

No. 1 cupola	45.00-46.00
Stove plate	45.00-46.00
Unstripped motor blocks	33.00-34.00
No. 1 wheels	34.00-35.00

Railroad Scrap

No. 1 R.R. heavy melt.	32.00-33.00
Rails, 18 in. and under	45.00-46.00
Rails, random lengths	37.00-38.00
Angles, splice bars	37.00-38.00

ST. LOUIS

(Brokers' buying prices)

No. 1 heavy melting	27.00
No. 2 heavy melting	25.00
No. 1 bundles	28.00
No. 2 bundles	*20.00*
No. 1 busheling	28.00
Machine shop turnings	8.00
Shovel turnings	10.00

Cast Iron Grades

No. 1 cupola	38.00
Charging box cast	33.00
Heavy breakable cast	31.00
Unstripped motor blocks	33.00
Clean auto cast	41.00
Stove plate	35.00

Railroad Scrap

No. 1 R. R. heavy melt.	32.00
Rails, random lengths	37.00
Rails, rerolling	49.00
Rails, 18 in. and under	40.00
Angles, splice bars	37.00

HOUSTON

(Brokers' buying prices; f.o.b. car)

No. 1 heavy melting	32.00-33.00
No. 2 heavy melting	29.00
No. 1 bundles	34.00
No. 2 bundles	20.00-21.00
Machine shop turnings	7.00-8.00†
Low phos. plate & structurals:	
3 ft	35.00
2 ft and under	*39.00-40.00*

Cast Iron Grades

No. 1 cupola	36.00-37.00
Heavy breakable	24.00
Foundry malleable	29.00-30.00†
Unstripped motor blocks	30.00-31.00

Railroad Scrap

No. 1 R.R. heavy melt.	32.00-33.00

LOS ANGLES

No. 1 heavy melting	30.00
No. 1 hvy melt (export)	34.00*
No. 2 heavy melting	28.00
No. 2 hvy melt (export)	30.00*
No. 1 bundles	25.00
No. 2 bundles	19.00
No. 2 bundles (export)	22.00*
Machine shop turnings	12.00
Shovel turnings	12.00
Cast iron borings	12.00
Cut structurals and plate 1 ft and under	40.00

Cast Iron Grades

No. 1 cupola	39.00

Railroad Scrap

No. 1 R.R. heavy melt.	34.00-36.00

PORTLAND, OREG.

(Prepared, f.o.b. car)

No. 1 heavy melting	38.00
No. 2 heavy melting	34.00
No. 2 bundles	19.00
Shovel turnings	13.00
Electric furnace bundles	46.00

Cast Iron Grades

No. 1 cupola	31.50
Heavy breakable	31.00
Unstripped motor blocks	31.00
Stove plate (f.o.b. plant)	18.00

SEATTLE

(Prepared, f.o.b. car)

No. 1 heavy melting	36.00
No. 1 (prepared for shears)	33.00
No. 1 hvy (unprepared)	33.00
No. 2 heavy melting	34.00
No. 2 hvy (unprepared)	30.00
No. 2 bundles	*22.00*
Shovel turnings	15.00
Electric furnace bundles	46.00

Cast Iron Grades

No. 1 cupola	31.50
Heavy breakable cast	33.00
Unstripped motor blocks	30.00
Stove plate (f.o.b. plant)	20.00

SAN FRANCISCO

No. 1 heavy melting	32.00
No. 2 heavy melting	29.00
No. 1 bundles	27.00-28.00
No. 2 bundles	18.00
Machine shop turnings	14.00
Mixed borings, turnings	14.00
Cast iron borings	14.00
Heavy turnings	14.00
Shovel turnings	14.00
Cut structurals, 3 ft	40.00

Cast Iron Grades

No. 1 cupola	46.00-48.00
Charging box cast	34.00
Stove plate	34.00
Heavy breakable cast	28.00
Unstripped motor blocks	31.00
Clean auto cast	40.00
Drop broken machinery	45.00-46.00
No. 1 wheels	34.00

HAMILTON, ONT.

(Brokers' buying prices; net tons)

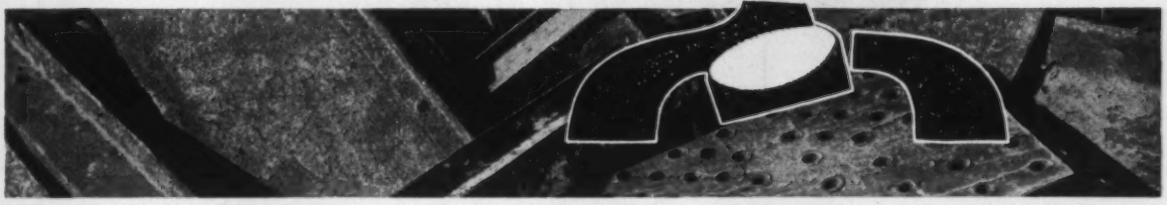
No. 1 heavy melting	24.00
No. 2 hvy melt, 2 ft & under	22.50
No. 1 bundles	24.00
No. 2 bundles	17.00
Mixed steel scrap	16.00
Mixed borings, turnings	12.00
Busheling, new factory:	
Prepared	23.00
Unprepared	18.00
Shovel turnings	12.00

Cast Iron Grades‡

No. 1 machinery cast	30.00

*For export add $4 dock charge.
†Nominal.
‡F.o.b. Hamilton, Ont.
‖Delivered.

FOR
GUARANTEED
ANALYSIS
OF
STAINLESS
AND
ALLOY
STEEL SCRAP



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First Metals Bill Introduced

Nonferrous Metal Prices, Pages 170 & 171

POLICIES that could have a far ranging effect on nonferrous metals are being formulated in Washington.

• **Off and Running**—It's no surprise that another lead-zinc aid bill has popped up in the early moments of the new Congress. Sponsor of the proposed legislation is Rep. Wayne Aspinall (D., Colo.), chairman of the House Interior Committee. The bill calls for: 1. Subsidy payments that would make up the difference between a 16 cent a pound price for both metals and the actual market prices. Payments would be limited to 2000 tons of lead and 2000 tons of zinc each in a 12 month period for any one company. 2. A 2 cent a pound import tax on lead and zinc metal and a 1.4 cent a pound tax on ores and concentrates. An identical levy would be added whenever the price of either metal falls below 13.5 cents a pound and lifted when the price goes above 14.5 cents. 3. A tax 2 cents a pound higher than the present one on the lead and zinc content of imported manufactured products.

One of the stumbling blocks to legislative action in the past, say Congressional sources, has been the failure of the lead-zinc industry to agree on the best method to solve its problems. The Aspinall bill, though by no means favored by all, probably comes closest to hitting a meeting of the minds than any measure introduced so far. This bill does not suggest a new approach. But it does wrap up what has been mainly presented in bits and pieces, and it offers relief to both big and little producers.

Where Aluminum Goes

(Percentage breakdown of shipments* in third quarter, 1960)

Building Products	27.5
Consumer Durable Goods	8.6
Transportation	13.8
Electrical	10.6
Machinery & Equipment (except electrical)	3.2
Containers & Packaging	10.1
Conversion into Wrought Products	6.6
Distributors & Jobbers	15.0
Exports	1.9
Miscellaneous	2.7

*Covers shipments of all wrought products and permanent mold and sand castings.
Source: Aluminum Association.

• **Will JFK Go Along?**—The next move is plainly up to President Kennedy. He has yet to reveal his philosophy toward metals legislation, but observers are betting he supports some type of lead-zinc measure.

Insiders size up the situation this way: Under Kennedy, the Interior Department will be significantly more important since it represents the hardest hit sector of the economy which the government can directly help. The administration may well temper its free trade philosophies and play ball with Congress on Interior matters—not only to bolster the economy but also to build support for prime administration programs.

The belief is growing Kennedy won't try to force feed a free trade program to lead and zinc supporters. Instead, some observers believe he will weigh the opposing economic and diplomatic factors and offer some sort of compromise between free trade and the Aspinall Bill.

• **Bombshell in Copper**—A much more radical proposal has been offered for copper. Over in the Senate, Majority Leader Michael J. Mansfield (D., Mont.), calmly stood up and dropped this bombshell offer: Formation of an international cartel to regulate copper prices and production. Whether the senator's suggestion was merely for home state consumption (there's considerable unemployment in the copper areas of Montana) or whether it represented an administration trial balloon has Washington and New York copper people guessing.

Historically, the U. S. has been opposed to any type of international cartel, both emotionally and legally through our antitrust laws. But other nations in recent years have talked seriously about such a move.

Copper producers are skittish about commenting on the Mansfield proposal except to point out government intervention in the free market process is seldom desirable.

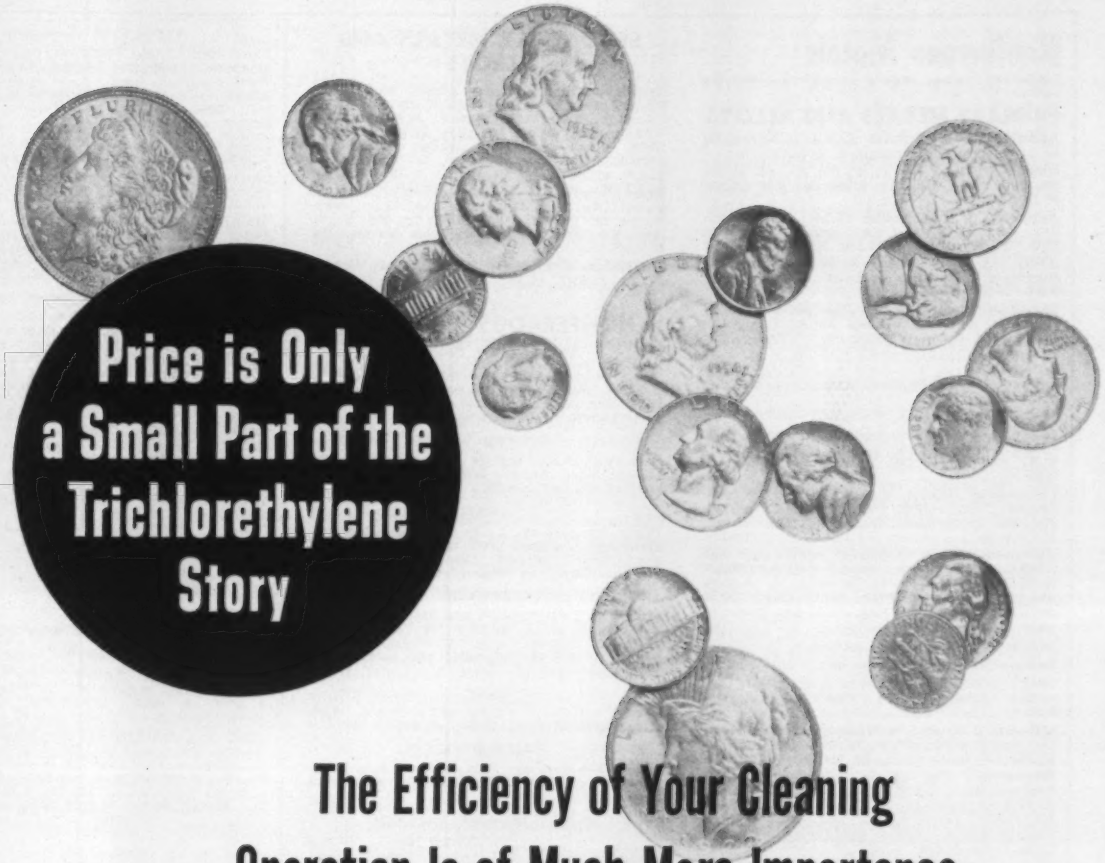
Some observers think the Mans-

(*Please turn to Page* 171)

NONFERROUS PRICE RECORD

	Feb. 8 Price	Last Change	Previous Price	Jan. Avg	Dec. Avg	Feb., 1960 Avg
Aluminum	26.00	Dec. 17, 1959	24.70	26.000	26.000	26.000
Copper	29.00	Jan. 17, 1961	29.00–30.00	29.340	30.000	34.000
Lead	10.80	Dec. 13, 1960	11.80	10.800	11.185	11.800
Magnesium	35.25	Aug. 13, 1956	33.75	35.250	35.250	35.250
Nickel	74.00	Dec. 6, 1956	64.50	74.000	74.000	74.000
Tin	100.50	Feb. 8, 1961	100.625	100.540	101.631	101.170
Zinc	11.50	Jan. 9, 1961	12.000	11.600	12.481	13.000

Quotations in cents per pound based on: COPPER, mean of primary and secondary, deld. Conn. Valley; LEAD, common grade, deld. St. Louis; ZINC, prime western, East St. Louis; TIN, Straits, deld. New York; NICKEL, electrolytic cathodes, 99.9%, base size at refinery, unpacked; ALUMINUM, primary ingot, 99.5+%, f.o.b. customer custody; MAGNESIUM, pig, 99.8%, Velasco, Tex.



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- PAINTBOND Compounds
- Aluminum Treating Compounds
- Alkali and Emulsion Cleaners
- Rustproofing Materials
- Extrusion and Drawing Compounds
- Spray Booth Compounds

Write for Dr. C. E. Kircher's informative article: "How to Get the Most Out of Solvent Degreasing".

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PRIMARY METALS AND ALLOYS

Aluminum: 99.5%, 50 lb ingots, 26.00, 30,000 lb or more, f.o.b. customer custody.

Aluminum Alloy: No. 13, 25.90; No. 43, 26.20; No. 195, 27.60; No. 214, 31.50; No. 356, 26.80, 50 lb ingots.

Antimony: R.M.M. brand, 99.5%, 29.00; Lone Star brand, 29.50, f.o.b. Laredo, Tex., in bulk. Foreign brands, 99.5%, 27.50-28.00, New York, duty paid, 10,0000 lb or more.

Beryllium: 97% lump or beads, $70.00 per lb, f.o.b. Cleveland or Reading, Pa.

Beryllium Aluminum: 5% Be, $65 per lb of contained Be, with balance as Al at market price, f.o.b. shipping point.

Beryllium Copper: 3.75-4.75% Be, $43 per lb of contained Be, with balance as Cu at market price on shipment date, f.o.b. shipping point.

Bismuth: $2.25 per lb, ton lots.

Cadmium: Sticks and bars, $1.60 per lb deld.
Cobalt: 99+%, $1.50 per lb for 500-lb keg; $1.52 per lb for 100 lb case; $1.57 per lb under 100 lb.

Columbium: Powder, $55 per lb and up nom.
Copper: Electrolytic, 29.00 deld.; custom smelters, 29.00; lake, 29.00 deld.; fire refined, 28.75 deld.

Germanium: First reduction, ingots, less than 1 kg, 36.00-37.50 per gram; 1-10 kg, 30.50-32.00 per gram; 10 kg or more, 28.10-29.99 per gram; lutristic grade, under 10 kg, 31.95 per gram; 10 kg or more, 29.95 per gram.

Gold: U. S. Treasury, $35 per oz.

Indium: 99.9%, $2.25 per troy oz.

Iridium: $70-75 per troy oz nom.

Lead: Common, 10.80; chemical, 10.90; corroding, 10.90; St. Louis, New York basis, add 0.20.

Lithium: 1 lb or 2 lb ingots, less than 24 lb, $11 per lb deld.; 24-90 lb, $9.50; 100-499 lb, $9.25; 450 lb or more, $9 per lb, delivered.

Magnesium: Pig, 35.25; ingot, 36.00 f.o.b. Velasco, Tex., 1.3 in. diam. x 12 in. sticks, 57.00 f.o.b. Madison, Ill.

Magnesium Alloy: AZ91A (diecasting), 40.75; AZ63A, AZ92A, AZ91C (sand casting), 40.75, f.o.b. Velasco, Tex.

Mercury: Open market, spot, N. York, $208-210 per 75 lb flask.

Molybdenum: Unalloyed forging billets, 4.125-8.5 in. diam., 50-4999 lb, $8.15-11.50 per lb, depending on quantity; 5000 lb or more, $8 per lb, f.o.b. Coldwater, Mich.

Nickel: Electrolytic cathodes, briquettes, sheets (4 x 4 in. and larger), unpacked, 74.00; 10-lb pigs, unpacked, 78.25; "XX" nickel shot, 79.50; "F" nickel shot for addition to cast iron, in kegs, 74.50; "F" nickel, 5 lb ingots, 75.50. Prices f.o.b. Port Colborne, Ont., including import duty. New York basis, add 1.01; Exton, Pa., basis, add 1.60. Nickel oxide sinter at Buffalo, New York, or other established U. S. Ports of entry, contained nickel 69.60.

Osmium: $70-90 per troy oz nom.

Palladium: $24-26 per troy oz.

Platinum: $82-85 per troy oz from refineries.

Radium: $16-21.50 per mg radium content, depending on quantity.

Rhodium: $137-140 per troy oz.

Ruthenium: $55-60 per troy oz.

Selenium: $6.50-7 per lb, commercial grade.
Silver: Open market, 91.375 per troy oz.
Sodium: Solid pack, c.l., 19.50; l.c.l, 20.00; brick, c.l., 21.00; l.c.l., 21.50; tank car, 17.00.
Tantalum: Melting stock, $35 per lb; rod $60 per lb nom; sheet, $55 per lb nom.
Tellurium: $3.50-5 per lb, 100 lb or more.
Thallium: $7.50 per lb.
Tin: Straits, N. Y., spot, 100.50; prompt, 100.375.
Titanium: Sponge, 99.3+% grade A-1, ductile (0.3% Fe max.), $1.60 per lb; grade A-2 (0.5% Fe max), $1.50 per lb.
Tungsten: Powder, 98.8%, carbon reduced, 100-lb lots, $2.75-2.85 per lb nom., f.o.b. shipping point; less than 1000 lb, add 15.00c; 99+% hydrogen reduced, $3.10-4.00.
Zinc: Prime western, 11.50; brass special, 11.75; intermediate, 12.00, East St. Louis, freight allowed over 0.50 per lb. New York basis, add 0.50. High grade, 12.85; special high grade, 13.00 deld. Die casting alloy ingot No. 3, 14.25; No. 2, 14.75; No. 5, 14.50 deld.
Zirconium: Reactor grade sponge, 100 lb or less, $8-8.50 per lb; 100-500 lb, $7.25-7.50 per lb, 500-1000 lb, $6.50-7.25; over 1000 lb, $6.50 per lb.
(Note: Chromium, manganese, and silicon metals are listed in ferroalloy section.)

SECONDARY METALS AND ALLOYS

Aluminum Ingot: Piston alloys, 25.00-26.00; No. 12 foundry alloy (No. 2 grade), 22.75; 5% silicon alloy, 0.60 Cu max., 24.00; 13 alloy, 0.60 Cu max., 24.00; 195 alloy, 25.75; 108 alloy, 23.25. Steel deoxidizing grades, notch bars, granulated or shot: Grade 1, 23.75; grade 2, 22.50; grade 3, 21.50; grade 4, 21.00.

Brass Ingot: Red brass, No. 115, 27.25; tin bronze, No. 225, 37.00; No. 245, 31.50; high-leaded tin bronze, No. 305, 31.75; No. 1 yellow, No. 405, 22.75; manganese bronze, No. 421, 26.50.

Magnesium Alloy Ingot: AZ63A, 37.50; AZ91B, 37.25; AZ91C, 41.25; AZ92A, 37.50.

NONFERROUS PRODUCTS

BERYLLIUM COPPER

(Base prices per lb, plus mill extras, 2000 to 5000 lb; nom. 1.9% Be alloy.) Strip, $1.935, f.o.b. Temple, Pa., or Reading, Pa.; rod, bar, wire, $1.935, f.o.b. Temple, Pa.

COPPER WIRE

Bare, soft, f.o.b. eastern mills, 20,000-lb lots, 34.355; l.c.l., 34.98. Weatherproof, 20,000-lb lots, 35.55; l.c.l., 36.30.

LEAD

(Prices to jobbers, f.o.b. Buffalo, Cleveland, Pittsburgh.) Sheets, full rolls, 140 sq ft or more, $16.50 per cwt; pipe, full coils, $16.50 per cwt; traps and bends, list prices plus 30%.

TITANIUM

(Prices per lb, 10,000 lb and over, f.o.b. mill.) Sheet and strip, $6.75-15.50; sheared mill plate, $5.25-9.00; wire, $5.55-9.50; forging billets, $3.20-4.75; hot-rolled and forged bars, $3.80-6.25.

ZINC

(Prices per lb, c.l., f.o.b. mill.) Sheets, 28.00; ribbon zinc in coils, 22.50; plates, 21.50.

ZIRCONIUM

Plate, $14.00-25.00; H.R. strip, $14.00-22.90; C.R. strip, $16.00-35.00; forged or H.R. bars, $11.00-17.40.

NICKEL, MONEL, INCONEL

	"A" Nickel	Monel	Inconel
Sheets, C.R.	138	120	138
Strip, C. R.	124	108	138
Plate, H.R.	130	110	126
Rod, Shapes, H.R.	107	89	109
Seamless Tubes	157	129	200

ALUMINUM

(Selected products and sizes)

Flat Sheets: 1100, 3003, and 5005, mill finish, 30,000 lb base f.o.b. customer custody.

Thickness Range (in.)	Width (in.)	Length Range (in.)	Price Range
0.250-0.136	24-72	72-180	45.40-48.00
0.136-0.096	24-72	72-180	45.90-48.80
0.096-0.077	24-72	72-180	46.40-50.30
0.077-0.068	24-72	72-180	46.90-52.10
0.068-0.061	24-72	72-180	46.90-55.00
0.061-0.048	24-72	72-180	47.40-57.70
0.048-0.038	24-72	72-180	47.90-60.50
0.038-0.030	24-72	72-180	48.40-65.30
0.030-0.024	24-72	72-180	48.90-67.20
0.024-0.019	24-60	72-180	49.40-59.90
0.019-0.017	24-48	72-144	50.30-57.00
0.017-0.015	24-48	72-144	51.20-58.00
0.015-0.014	24-36	72-144	52.30
0.014-0.012	24-36	72-144	53.50
0.012-0.011	24-36	72-144	54.60
0.011-0.0095	24-48	72-144	56.20
0.0095-0.0085	24-36	72-96	57.50
0.0085-0.0075	24-36	72-96	59.20
0.0075-0.007	24-36	72-96	60.80
0.007-0.006	24-36	72-96	62.50

ALUMINUM (continued)

Plates and circles: Thickness, 0.25-3 in.; width or diam., 24-60 in.; lengths, 72-240 in., mill finish.

Alloy	Plate Base	Circle Base
1100, 3003-F	44.60	50.90
5050-F	45.70	50.50
3004-F	46.70	52.40
5052-F	47.30	53.10
6061-T6	47.80	53.90
2024-T4*	51.80	58.90
7075-T6*	60.50	67.90

*24-48 in. width or diam., 72-180 in. lengths.

Screw Machine Stock: 30,000 base, 12 ft lengths

Diam	Round		Hexagonal	
(in.)*	2011-T3	2017-T4	2011-T3	2017-T4
0.125	74.90	77.30	....	....
0.188	63.20	63.20	....	80.10
0.250	60.00	62.60	72.70	74.10
0.375	59.20	63.80	71.00	72.00
	2011-T3	2017-T451	2011-T3	2017-T451
0.500	59 20	63.80	71.00	72.00
0.625	59.20	63.80	67.80	67.90
0.750	57.70	62.00	61.60	63.80
0.875	57.70	62.00	61.60	63.80
1.000	57.70	62.00	61.60	63.80
1.125	55.30	59.50	59.50	61.50
1.250	55.30	59.50	59.50	61.50
1.375	55.30	59.50	59.50	61.50
1.500	55.30	59.50	59.50	61.50
1.625	53.00	56.70	....	59.30
1.750	53.00	56.70	58.30	59.30
1.875	53.00	56.70	....	59.30
2.000	53.00	56.70	58.30	59.30
2.250	51.50	55.00	....	59.30
2.500	51.50	55.00	....	59.30
2.750	49.90	53.20	....	59.30
3.000	49.00	53.20	....	59.30
3.250	....	53.20	....	....
3.375	....	53.20	....	....

*Selected sizes.

Forging Stock: Round, Class 1, random length, diam., 0.375-8 in., "F" temper; 2014, 47.50-57.60; 6061, 43.50-57.60; 7075, 61.80-71.90; 7079, 66.80-76.90.

Pipe: ASA schedule 40, alloy 6063-T6, 3-40 ft lengths, plain ends, 90,000 lb base, dollars per ft. Nominal pipe sizes: 1 in., 32.00; 1¼ in., 43.40; 1½ in., 51.80; 2 in., 62.60; 3 in., 124.95; 4 in., 171.80; 5 in., 233.15; 6 in., 308.55; 8 in., 464.35; 10 in., 716.25 (3-24 ft lengths).

Factor	Alloy 6063-T5	Alloy 6062-T6
1-14	45.30-46.80	54.00-60.00
15-17	45.30-46.80	56.50-61.80
18-23	45.80-47.50	58.60-67.60
24-32	45.80-47.50	66.80-81.50
33-38	49.50-52.20	85.10-96.60
39-44	59.80-63.60	102.00-124.00

MAGNESIUM

Sheets and Plates: AZ31B standard grade, .032 in., 103.10; .081 in., 77.90; .125 in., 70.40; .188 in., 69.00; .250-2.00 in., 67.90. AZ31B spec. grades, .032 in., 171.30; .081 in., 103.80; .125 in., 98.10; .188 in., 95.70; .250-2.00 in., 93.30. Tread plate, 60-192 in. lengths, 24.72 in. widths; .125 in., 74.90; .188 in., 71.70-72.70; .25-.75 in., 70.60-71.60. Tooling plate, 0.25-3.00 in., 73.00.

Extruded Solid Shapes:

Factor	Com. Grade (AZ31C)	Spec. Grade (AZ31B)
6-8	65.30-67.60	84.60-87.40
12-14	65.30-67.60	85.70-88.00
24-26	66.10-68.40	90.60-91.30
36-38	71.50-75.30	104.20-105.30

NONFERROUS SCRAP

DEALERS' BUYING PRICES

Copper and Brass: No. 1 heavy copper and wire, 21.25-21.75; No. 2 heavy copper and wire, 19.25-19.75; light copper, 16.50-17.00; No. 1 composition red brass, 17.25-17.75; No. 1

BRASS MILL PRICES

MILL PRODUCTS a

	Sheet, Strip, Plate	Rod	Wire	Seamless Tubes
Copper	54.13b	51.36c	....	55.32
Yellow Brass	48.10	33.71d	48.39	52.26
Low Brass, 80%	50.65	50.39	50.94	54.71
Red Brass, 85%	51.54	51.48	51.83	55.60
Com. Bronze, 90%	52.98	52.92	53.27	56.79
Manganese Bronze	56.56-56.59	50.22-50.24	60.47	....
Muntz Metal	50.94	46.25	....	....
Naval Brass	52.86	46.67	59.17	57.02
Silicon Bronze	59.49	58.68	58.78	77.90
Nickel Silver, 10%	63.66	65.99	65.74	....
Phos. Bronze, A-5%	74.59	75.09	74.34	76.52

SCRAP ALLOWANCES e

(Based on copper at 29.00c)

	Clean Heavy	Rod Ends	Clean Turnings
Copper	25.000	25.000	24.250
Yellow Brass	19.250	18.375	17.375
Low Brass, 80%	21.375	21.125	20.625
Red Brass, 85%	22.250	22.000	21.500
Com. Bronze, 90%	23.000	22.750	22.250
Manganese Bronze	18.000	17.750	17.250
Muntz Metal	18.125	17.875	17.375
Naval Brass	18.000	17.750	17.250
Silicon Bronze	24.500	24.250	23.500
Nickel Silver, 10%	24.125	23.875	12.062
Phos. Bronze, A-5%	26.125	25.875	24.875

a, Cents per lb, f.o.b. mill; freight allowed on 50 lb or more. b. Hot-rolled. c. Cold-drawn. d. Free cutting. e. Prices in cents per lb for less than 20,000 lb, f.o.b. shipping point. On lots over 20,000 lb at one time of any or all kinds of scrap, add 1 cent per lb.

composition turnings, 16.25-16.75; new brass clippings, 14.50-15.00; light brass, 11.50-12.00; heavy yellow brass, 12.50-13.00; new brass rod ends, 13.50-14.00; auto radiators, unsweated, 13.00-13.50; cocks and faucets, 14.25-14.75; brass pipe, 14.75-15.25.

Lead: Soft scrap lead, 7.00-7.50; battery plates, 2.75-3.00; linotype and stereotype, 8.00-8.50; electrotype, 7.50-8.00; mixed babbitt, 9.00-9.50.

Monel: Clippings, 23.00-24.00; old sheets, 22.00-23.00; turnings, 16.50-17.50; rods, 22.00-23.00.

Nickel: Sheets and clips, 51.00-53.00; rolled anodes, 51.00-53.00; turnings, 39.00-40.00; rod ends, 51.00-53.00.

Zinc: Old zinc, 2.50-2.75; new diecast scrap, 2.75-3.00; old diecast scrap, 1.00-1.50.

Aluminum: Old castings and sheets, 9.00-9.50; clean borings and turnings, 4.50-5.00; segregated low copper clips, 11.00-11.50; segregated high copper clips, 10.00-10.50; mixed low copper clips, 10.50-11.00; mixed high copper clips, 10.00-10.50.

(Cents per pound, Chicago)

Aluminum: Old castings and sheets, 10.00-10.50; clean borings and turnings, 7.00-7.50; segregated low copper clips, 15.00-15.50; segregated high copper clips, 13.50-14.00; mixed low copper clips, 12.50-13.00; mixed high copper clips, 12.00-12.50.

(Cents per pound, Cleveland)

Aluminum: Old castings and sheets, 10.00; clean borings and turnings, 8.50; segregated low copper clips, 14.00; segregated high copper clips, 13.00; mixed low copper clips, 13.00; mixed high copper clips, 12.50.

REFINERS' BUYING PRICES

(Cents per pound, carlots, delivered refinery)

Beryllium Copper: Heavy scrap, 0.020-in. and heavier, not less than 1.5% Be, 55.00; light scrap, 50.00; turnings and borings, 35.00.

Copper and Brass: No. 1 heavy copper and wire, 24.50; No. 2 heavy copper and wire, 23.00; light copper, 20.25; refinery brass (60% copper) dry copper content, 21.00.

INGOTMAKERS' BUYING PRICES

Copper and Brass: No. 1 heavy copper and wire, 24.50; No. 2 heavy copper and wire, 23.00; light copper, 20.25; No. 1 composition borings, 19.00-20.75; No. 1 composition solids, 20.00-21.25; heavy yellow brass solids, 15.00-16.50; yellow brass turnings, 13.00-15.50; radiators, 16.00-16.50.

PLATING MATERIAL

(F.o.b. shipping point, freight allowed on quantities)

ANODES

Cadmium: Special or patented shapes, $1.60.

Copper: Flat-rolled, 46.04; oval, 42.50; electrodeposited, 38.00; cast, 40.50, 5000-10,000 lb quantities.

Nickel: Depolarized, less than 100 lb, 114.25; 100-499 lb, 112.00; 500-4999 lb, 107.50; 5000-29,999 lb, 105.25; 30,000 lb, 103.00. Carbonized, deduct 3 cents a lb.

Tin: Bar or slab, less than 200 lb, 119.50; 200-499 lb, 118.00; 500-999 lb, 117.50; 1000 lb or more, 117.00.

Zinc: Balls, 18.75; flat tops, 18.75; flats, 21.50; ovals, 20.75, ton lots.

CHEMICALS

Cadmium Oxide: $1.60 per lb in 100-lb drums.

Chromic Acid (flake): 100-2000 lb, 31.00; 2000-10,000 lb, 30.50; 10,000-20,000 lb, 30.00; 20,000 lb or more, 29.50.

Copper Cyanide: 100-200 lb, 65.90; 300-900 lb, 63.00; 1000-19,000 lb, 61.90.

Copper Sulphate: 100-1900 lb, 15.00; 2000-5900 lb, 13.00; 6000-11,900 lb, 12.75; 12,000-22,900 lb, 12.50; 23,000 lb or more, 12.00.

Nickel-Chloride: 100 lb, 45.00; 200 lb, 43.00; 300 lb, 42.00; 400-4900 lb, 40.00; 5000-9900 lb, 38.00; 10,000 lb or more, 37.00.

Nickel Sulphate: 5000-22,999 lb, 29.00; 23,000-39,900 lb, 28.50; 40,000 lb or more, 28.00.

Sodium Cyanide (Cyanobrik): 200 lb, 23.80; 400-900 lb, 20.80; 1000-4900 lb, 19.80; 5000-19,900 lb, 18.80; 20,000 lb or more, 17.60.

Sodium Stannate: Less than 100 lb, 79.10; 100-900 lb, 69.70; 700-1900 lb, 67.00; 2000-9900 lb, 65.10; 10,000 lb or more, 63.80.

Stannous Chloride (Anhydrous): 25 lb, 154.40; 100 lb, 149.50; 400 lb, 147.10; 800-19,900 lb, 106.20; 20,000 lb or more, 100.10.

Stannous Sulphate: Less than 50 lb, 139.60; 50 lb, 109.60; 100-1900 lb, 107.60; 2000 lb or more, 105.60.

Zinc Cyanide: 100-200 lb, 59.00; 300-900 lb, 57.00.

(*Concluded from Page* 168)

field proposal might lead to some type of voluntary United Nations project to stabilize the extremes in copper production and prices.

• **Aluminum vs. GATT**—Domestic primary aluminum producers are sweating out a Tariff Commission decision on whether the present duty of 1.25 cents a pound (on primary metal) should be lowered.

At a commission hearing, domestic producers gave these arguments against aluminum being placed on the list for which tariff concessions may be offered at the upcoming General Agreement on Tariffs & Trade meeting in Geneva: 1. The U. S. has substantial idle capacity. 2. Imports are not needed for defense because of our large stockpile. 3. Because of large supplies on hand, imports are not needed by fabricators.

Aluminium Ltd. countered and said imports have "had no injurious effect whatever on the domestic industry" and that imports "have been essential to the maintenance of manufacturing operations here." Milton J. Smith, president of Trim Alloys Inc., Boston, an extruder, echoed the attitude of many independents when he said: "The ability to buy ingots from foreign sources is essential for the preservation of companies such as my own."

Even though the maximum allowable tariff reduction at this time would be 20 per cent, or 0.25 cent a pound, aluminum people contend this would be just one more incentive to importers who are underselling domestic producers by as much as 5 cents a pound in some mill products, like sheets. Producers ask: With Europe continually raising aluminum tariffs, why should we lower ours?

If the commission finds the domestic industry is being injured, it will be obliged under law to hold an "escape clause" hearing. If no injury is found, aluminum will automatically go on the GATT list.

STRUCTURAL SHAPES . . .

STRUCTURAL STEEL PLACED

1122 tons, 94 transmission towers, government furnished; 23.1 miles of 245 kv transmission line, Wasco, Hood River, and Clackamas Counties, Oregon; Key Construction Co., Tacoma, Wash., low at $333,613 to the Bonneville Power Administration, Portland, Oreg.

900 tons, Oregon State freeway overhead, Portland, Oreg.; reported to American Bridge Div., U. S. Steel Corp., Portland, Oreg.; Kuckenberg Construction Co., Portland, general contractor at $991,434.

500 tons plus, reactor project building, 109, Hanford Works, to unstated interest; Kaiser Engineers, prime contractor.

150 tons, J. C. Penney Store, Spokane, Wash., to unstated interest.

133 tons, also 66 tons of reinforcing, conversion of Copper River bridge, Alaska, to Pacific Coast Div., Bethlehem Steel Co., Seattle; Cole & Babcock, Juneau, Alaska, general contractor at $299,233.

180 tons, 3-story office building, Wilmington, Del., to High Welding Co., Lancaster, Pa.

100 tons, trestle for Tacoma's Mayfield Dam, to Star Iron Works, Tacoma, Wash.

STRUCTURAL STEEL PENDING

3000 tons, 16 story, steel frame Standard Insurance Co. office building, Portland, Oreg.; bids Mar. 16; Skidmore, Ewins & Merrill, Portland, architects.

2500 tons, approach work to the state Ft. Duquesne Bridge, Pittsburgh, bids March 3.

1300 tons, courthouse addition, Philadelphia, Electronic & Facils Inc., New York, low on the general contract.

1223 tons, six highway bridges, Southington, Conn.; bids Feb. 6, Hartford, Conn.; also required, 400 tons of concrete reinforcing bars, 306 tons of steel piles, and 260 tons of mat reinforcement.

CLASSIFIED ADVERTISING

Help Wanted

LARGE FABRICATOR OF STRUCTURAL STEEL for buildings, bridges, dams, locks, etc., located in deep south, seriously looking for qualified Chief Draftsman. Must assume complete responsibility for operation of drafting room of over fifteen men. Prefer Civil Engineer with at least 10 years' experience in structural detailing, capable of commanding the co-operation of his men and obtaining the highest quality of workmanship. We are seeking a highly trained man with executive capacity, and expect to pay the right salary for the right man. In reply give full experience record and educational background, stating age, marital status and salary expected. Reply Box 903, STEEL, Penton Bldg., Cleveland 13, Ohio.

SALESMAN TO COVER CHICAGO TERRITORY selling mill and heavy industrial overhead traveling cranes. Respond to Box 893, STEEL, Penton Bldg., Cleveland 13, Ohio.

SALESMAN TO COVER EASTERN PENNSYLVANIA, Delaware and New Jersey territory, representing a steel fabricator. Prefer man experienced in selling steel and allied products. Send resume to Box 901, STEEL, Penton Bldg., Cleveland 13, Ohio.

Machinery and Equipment Wanted

WANTED

Used SIZE 2 OR 3 FOURSLIDE FORMING MACHINES. BAIRD, MANVILLE, U. S. MULTISLIDE.

R. F. NAUMAN MFG. CORP.
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You can choose **JOB-MATED** Hoists in capacities from ¼-ton to 30 tons . . . with motor-driven or push-type trolleys . . . single or multiple speed controls (multiple speed provides from 5 to 17 control steps) . . . pushbutton, pendant rope, or lever controllers . . . floor or cab-operation . . . vapor-proof or explosion-proof construction.

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1183 tons, state bridgework, Delaware County, Pennsylvania, bids Feb. 17; also required are 417 tons of reinforcing bars.

872 tons, state bridgework, Allegheny County, Pennsylvania, bids Feb. 17; 287 tons of reinforcing bars are also required.

411 tons, two composite wide flange beam bridges, Chester, Vt.; Miller Construction Co., Windsor, Vt., low on the general contract; also required, 135 tons of concrete reinforcing bars.

400 tons, addition to 105 N. reactor building, Hanford Works; H. Halvorson, Yardley, Wash., is low at $1,307,606 to Kaiser Engineers, prime contractor.

245 tons, state bridgework, Union County, New Jersey, bids Feb. 16; also, 102 tons of reinforcing bars required.

197 tons, channels, Grade M, Military Industrial Supply Agency, Philadelphia; bids Feb. 7; also required, 70 tons of plates.

100 tons or more, radar tower, Opheim Air Base, Montana; Riordan Construction Co., Glasgow, Mont., low at $234,600 to the U. S. Engineer, Seattle.

100 tons or more, radar tower, air base, Oregon; bids to the U. S. Engineer, Seattle, March 7.

100 tons, angles, Grade M, Military Industrial Supply Agency, Philadelphia; bids Feb. 6.

REINFORCING BARS . . .

REINFORCING BARS PLACED

220 tons (government furnished), Big Eddy-Washington transmission line, Oregon State; bids in to the Bonneville Power Administration, Portland, Oreg.

94 tons, custom warehouse, Seattle, to Pacific Coast Div., Bethlehem Steel Co., Seattle; Norman Berg, general contractor.

REINFORCING BARS PENDING

350 tons, conversion of Seattle Auditorium; general contract to Brazier Construction Co., Seattle.

100 tons, West Seattle athletic field grandstand; F. S. Jones Construction Co., Seattle, low at $89,595.

60 tons, Queen Anne High School gymnasium, Seattle; a $400,000 project; bids in.

Unstated, four Montana State concrete highway bridges, total length 346 ft; bids to Helena, Mont., Feb. 21.

PLATES . . .

PLATES PLACED

1000 tons, Port of Vancouver, Wash., tank farm, to Chicago Bridge & Iron Co., Seattle.

100 tons, water tank, Parkrose District, Portland, Oreg., reported to Gunderson Bros. Engineering Co., Portland.

49 tons, piling, Eagle River bridge, Alaska, to Pacific Coast Div., Bethlehem Steel Co., Seattle.

PLATES PENDING

500 tons or more (if plate awarded) storage reservoir, Alderwood Manor, Wash.; Chicago Bridge & Iron Co., Seattle, low at $722,389; various alternatives were also submitted.

80 tons, King County District No. 58, Seattle, water tank; Pittsburgh-Des Moines Steel Co., Seattle, low at $47,353.

200 tons, steel piling, state fisheries project; bids invited by Washington State Fisheries Commission, Olympia, Wash.

PIPE . . .

CAST IRON PIPE PENDING

150 tons, 6 in.; bids in to Bellingham, Wash.

RAILS, CARS . . .

RAILROAD CARS PLACED

Trailer Train, six hundred 85-ft piggyback flatcars, distributed among ACF Industries Inc., New York; Bethlehem Steel Co., Bethlehem, Pa.; General American Transportation Corp., Chicago; and Pullman-Standard Div., Pullman Inc., Chicago.

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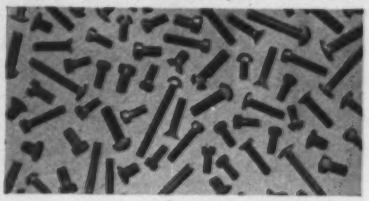
IT PAYS TO HAVE GOOD CONNECTIONS
HUBBELL

COLD HEADED ROLLED THREAD
PRECISION
FASTENERS

STANDARD AND BINDING HEAD SCREWS
Slotted, Phillips, Sems; also type A, B and C Tapping Screws and type F thread cutting screws.



MINIATURE FASTENERS
Sizes #0 and #1 Steel, Stainless Steel, Brass.

COLD HEADED PARTS, RIVETS, STUDS
Custom designed. Large production facilities.

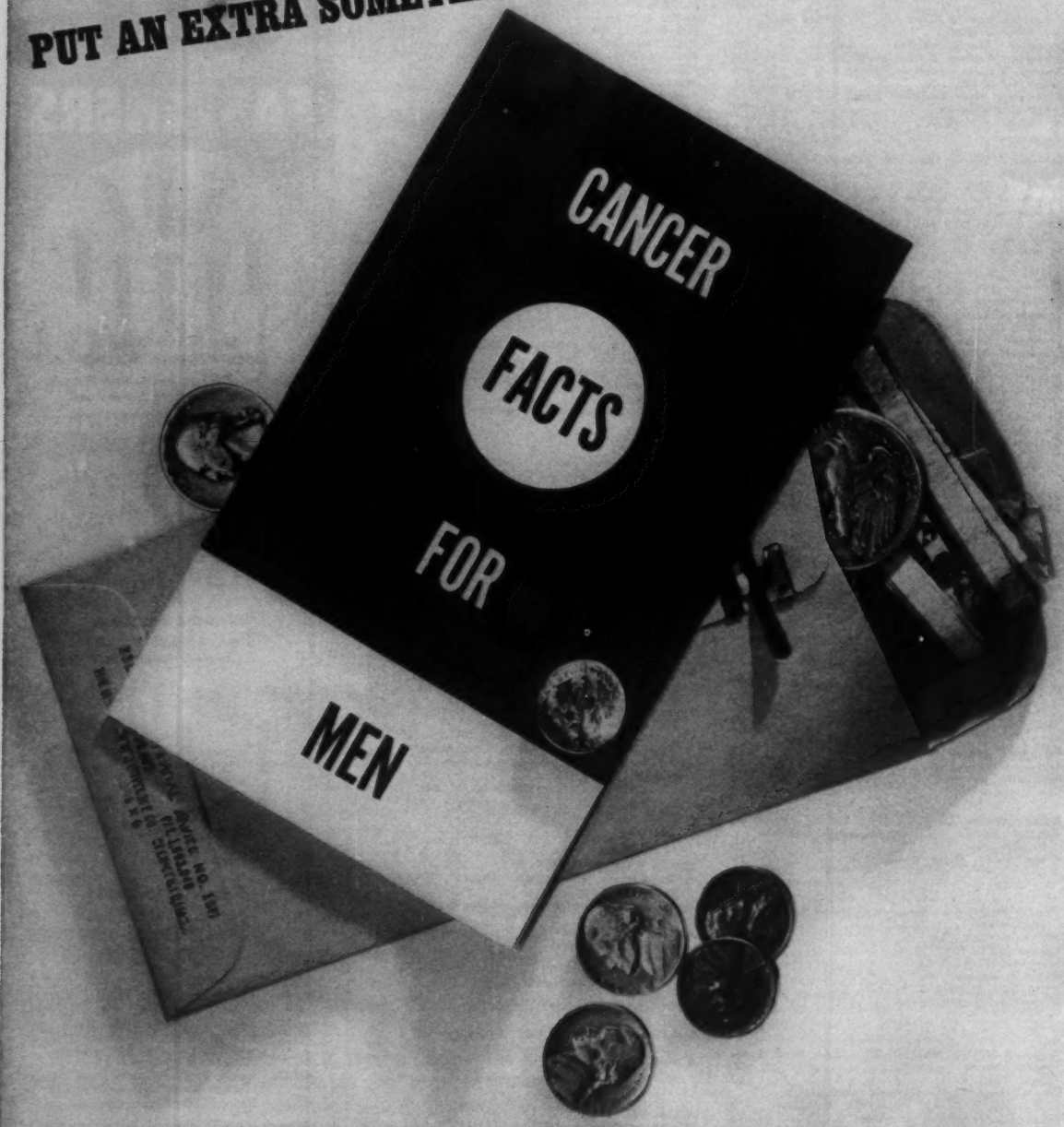
HEADS Flat, Round, Oval, Fillister, Binding, Truss, Jackson, Washer, Pan, Knurled, Depressed Hex Head, Sems Fastener Units with Attached Shakeproof or split-type lock washers.

METALS Brass, Steel, Stainless Steel, Monel, Nickel Silver, Aluminum, Silicon Bronze, Commercial Bronze.

FINISHES Nickel, Cadmium, Zinc, Brass, Bronze, Chrome, Parkerizing, Iridite, Blued.

HARVEY
HUBBELL,
INCORPORATED
MACHINE SCREW DEPARTMENT
BRIDGEPORT 2, CONNECTICUT

PUT AN EXTRA SOMETHING IN THEIR PAY ENVELOPES



It could be the biggest bonus you ever gave your employees—life-saving facts about cancer. Whether you have a factory or an office—a hundred or a thousand employees—we are prepared to offer a cancer education program to meet your particular requirements. Pamphlets, posters, films and speakers will bring vital information to your employees. Such programs pay off in saving lives. Call your local American Cancer Society for further information. Do it today.

American Cancer Society

Al Lussier, Group Leader,
Cleaning Department,
Worthington Corporation,
Holyoke, Massachusetts

"We cut abrasive costs two-thirds when we switched to Rotoblast Steel Shot"

Chilled iron shot had been used previously at Worthington's Holyoke plant. When the switch to Rotoblast Steel Shot was made, not only did abrasive costs drop by two-thirds, but wheel vanes which lasted only 60 hours with chilled iron shot, now last 240 hours!

The Worthington people are fully aware that Rotoblast Steel Shot costs more than chilled iron shot. But they also know their Rotoblast Steel Shot lasted six times as long! In their thinking, it isn't the cost of the abrasive, but the cost of the end result that counts.

You, too, can reduce cleaning costs if you change to Rotoblast Steel Shot.

For complete information write to PANGBORN CORPORATION, 1600 Pangborn Blvd., Hagerstown, Md. *Manufacturers of Blast Cleaning, Vibratory, Dust Control Equipment—Rotoblast Steel Shot and Grit.*®

Pangborn ROTOBLAST®
STEEL SHOT AND GRIT

IN MANY WAYS,
IN MANY PLACES...
special Ingersolls help to reduce costs, increase profits

What you see this machine doing was considered impractical only five years ago. It took a new and special kind of horizontal spindle machine to use carbide cutting tools on steel weldments as much as 12 feet above the floor.

The 108-ton special Ingersoll in the picture is shown milling a wind tunnel segment at one of Canada's busiest shipbuilding and general engineering works—Canadian Vickers, Ltd., Montreal, Quebec.

THE INGERSOLL
MILLING MACHINE COMPANY • ROCKFORD, ILLINOIS